

OUTSOURCING NETWORK MANAGEMENT
AND OPERATIONS

INPUT

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**U.S. Outsourcing Information Systems
Program**
(SOSOP)

***Outsourcing Network Management
and Operations***

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Abstract

This report examines the network management component of the outsourcing arrangement. As client/server technology continues to grow in importance, and as voice, data and image networking technologies become more integrated into mission-critical solutions, the telecommunications network and the outsourcing of its management become a major strategic element in the success of global companies.

The trend is for most organizations to have one user organization responsible for both voice and data. By 1997 it is expected that over 90% of organizations will do this.

Other changes expected over the next five years include:

- Data, image and video will increase their respective shares of the currently voice-dominated networks.
- An increasing shift to packet switch networks will occur.
- The replacement of private networks with shared networks will increase.
- The market will be dominated by the common carriers and large systems integrators.
- More outsourcing agreements will include both a systems operations and a network component in the same contract.

A thorough discussion of user expectations and the capabilities of the network management vendors identifies a number of large discrepancies between perceived needs and the vendors' abilities to meet those needs with their current service offerings. The research findings give vendors clear directions on how to better prepare themselves to meet the emerging market demands.

User requirements are also identified by type of client. As might be expected, some clients have a much more international perspective than other, more regionally focused clients. The alliances that are formed by the vendors to service the wide range of needs are discussed in detail. Illustrations are provided to clarify these points.

This report contains 108 pages and 69 exhibits. It was prepared as part of INPUT's U.S. Outsourcing Information Systems Program.

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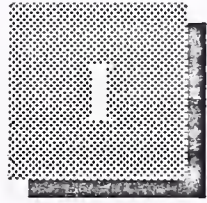
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Introduction

A

Purpose and Scope

Outsourcing is becoming more specialized as users seek expanded levels of service from vendors. Increasingly, outsourcing opportunities include systems operations and network management as integral parts of systems management contracts.

This report focuses on the strategic importance of the network operations management component of the outsourcing arrangement. As client/server technology continues to grow in importance to include enterprise computing, and as voice, data, video and image networking technologies become increasingly integrated into mission-critical applications solutions, the telecommunications network becomes the focus for future outsourcing growth.

This report will:

- Describe the existing market for outsourced network services
- Differentiate between the various parts of the service offering
- Identify how vendors are currently serving the outsourced network services market and how alliances and consortia are evolving to provide the users with “one-stop shopping”
- Investigate what teaming patterns are emerging in the marketplace
- Identify user requirements and relate them to the type of client. (i.e., international, national, regional, or industry orientation)
- Forecast the size of the market by type of service for the period 1992-1997

Answers to specific questions and issues will be addressed, including:

- How large is the market for outsourced network management?
- Who are the vendors in this market and in which submarkets are they active? What strategy have vendors used to gain market share?
- Do certain vendors have an advantage in this marketplace due to presence, skill set or reputation?
- What are the motivators for buyers to outsource their network management activities, and are they outsourcing all or just a portion of it?
- How are buyer organizations currently organized to manage their networks, and who will make the decision to outsource?
- What is the relationship between outsourcing systems operations and network management? Is the same vendor used for both?
- Is the use of alliances/consortia a short-term or long-term strategy?
- Are there technological changes that will have a large impact on market growth from 1992 to 1997?
- What is the level of satisfaction among current clients of network outsourcing vendors?

B

Methodology

Research for this report included a review of published data to identify activities and trends that have been noted, and primary research with users and vendors. Key elements of the research included the following:

- A review of background data about trends and directions in the management of network services
- A review of background data about key issues affecting the successful management of networks
- Interviews with large, medium and small network users to ascertain their attitudes toward contracting with outside vendors for management of their networks
- Interviews with vendors of network management services to assess the reasons that organizations contracted for services and what services are typically included in a contract

To develop an understanding of differences that might exist between users and vendors of network management products and services, the primary research included both objective and subjective questions.

The objective questions were oriented to developing an understanding of whether contracted services have been or will be considered and accepted.

The subjective questions were oriented to developing an understanding of the reasons that users are for or against contracting for network management services. Similar subjective questions were asked of users and vendors to assess whether there are any major differences.

To develop a market forecast for network operations management services, INPUT took several factors into account:

- Companies that represent the greatest opportunities are believed to be those that have a diversity of network needs and lack the skills to effectively manage a broad technological base.
- From the user responses, there appears to be increasing interest in turning over management of an organization's network to a qualified outside contractor.
- Consideration was given to how changes in other areas, such as systems operations (or facilities management), could affect the development of a market for network operations management services.

C

Report Organization

Following the Introduction, the report is organized into the following chapters:

- Chapter II is an Executive Overview.
- Chapter III discusses the characteristics of the market for network management outsourcing—user needs and outsourcing experience. User respondents' current and forecast requirements for voice, data, video and image communication services are reviewed. Vendor respondents' perspective on market segment revenue for 1991 and 1997 and user requirements is provided as well.
- Chapter IV describes vendor perspectives and strategies.
- Chapter V focuses on market trends and forecasts. Issues related to the growth of network management outsourcing that face large organizations are discussed.

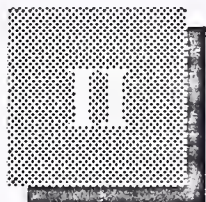
- Chapter VI draws conclusions and provides recommendations to users and vendors of network management products and services.

D

Related Reports

INPUT reports related to network integration include the following:

- *Network Integration, 1990-1995*. An analysis of the market for network integration services and the relationship of network integration to systems integration.
- *Network Management: User Needs and Requirements*. A comprehensive assessment of user needs in managing complex corporate networks.
- *U.S. Systems Operations/Outsourcing Market Analysis, 1991-1996*
- *Network Operations Management, 1990-1995*



Executive Overview

This report focuses on the market needs that are met by network operations management. The research identifies user benefits realized through outsourcing all or part of a company's network operation. The report forecasts market size, growth, vendor strategies and trends for the period 1992-1997.

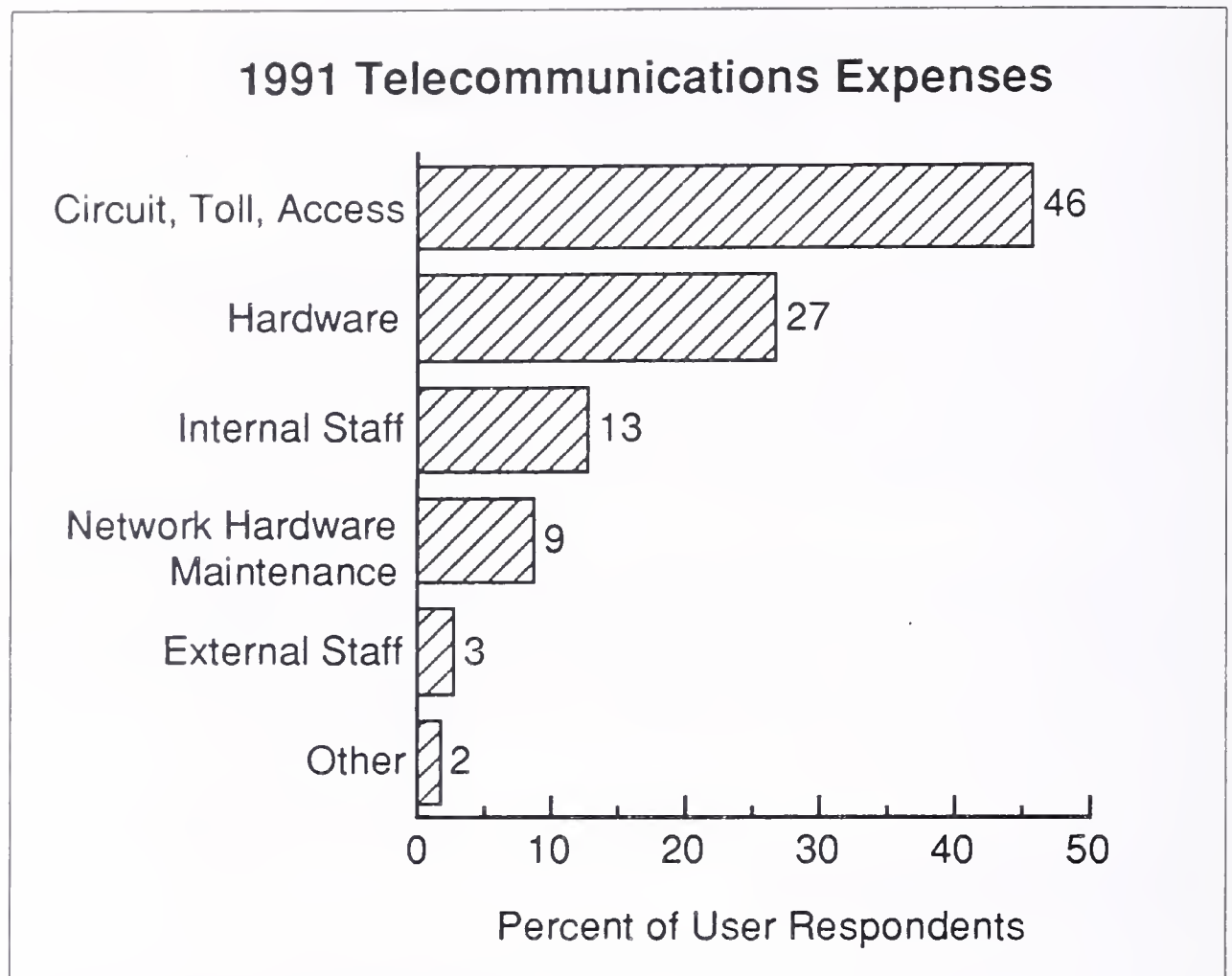
A

Market Characteristics

Seventy-one percent of user organizations surveyed by INPUT currently have a single organization responsible for voice and data communications. By 1997, these users believe about 90% of companies will have one organization responsible for all corporate telecommunications requirements. This trend has important implications for network operations management vendors and users. The users' internal structure will be better prepared for making the decision to outsource the corporate telecommunications network. Vendors will get opportunities to increase their percentage of voice services. The trend toward a single corporate telecommunications organization will better focus the vendors' marketing effort and tend to shorten the users' decision process. Eighty-two percent of user respondents that manage their network internally considered outsourcing all or part of their telecommunications networks. These users are in various stages of the network outsourcing decision process, which can take up to 18 months. Some users have shown an inclination to make an incremental commitment to outsourcing their networks. Others expressed concern over vendor motivation and level of expertise in voice and data.

In 1991, participating users spent 46% of their telecommunications budgets on circuit, toll and access charges, 36% on telecommunications hardware including maintenance, and 16% on internal and external staff. Exhibit II-1 summarizes these expenses.

EXHIBIT II-1



Users ranked local- and metropolitan-area networks as the most important network service. Voice was second, followed by international data networks, wide-area networks and intersite data networks. Preference varied widely by firm. Exhibit II-2 shows the strategic importance of LANs to users.

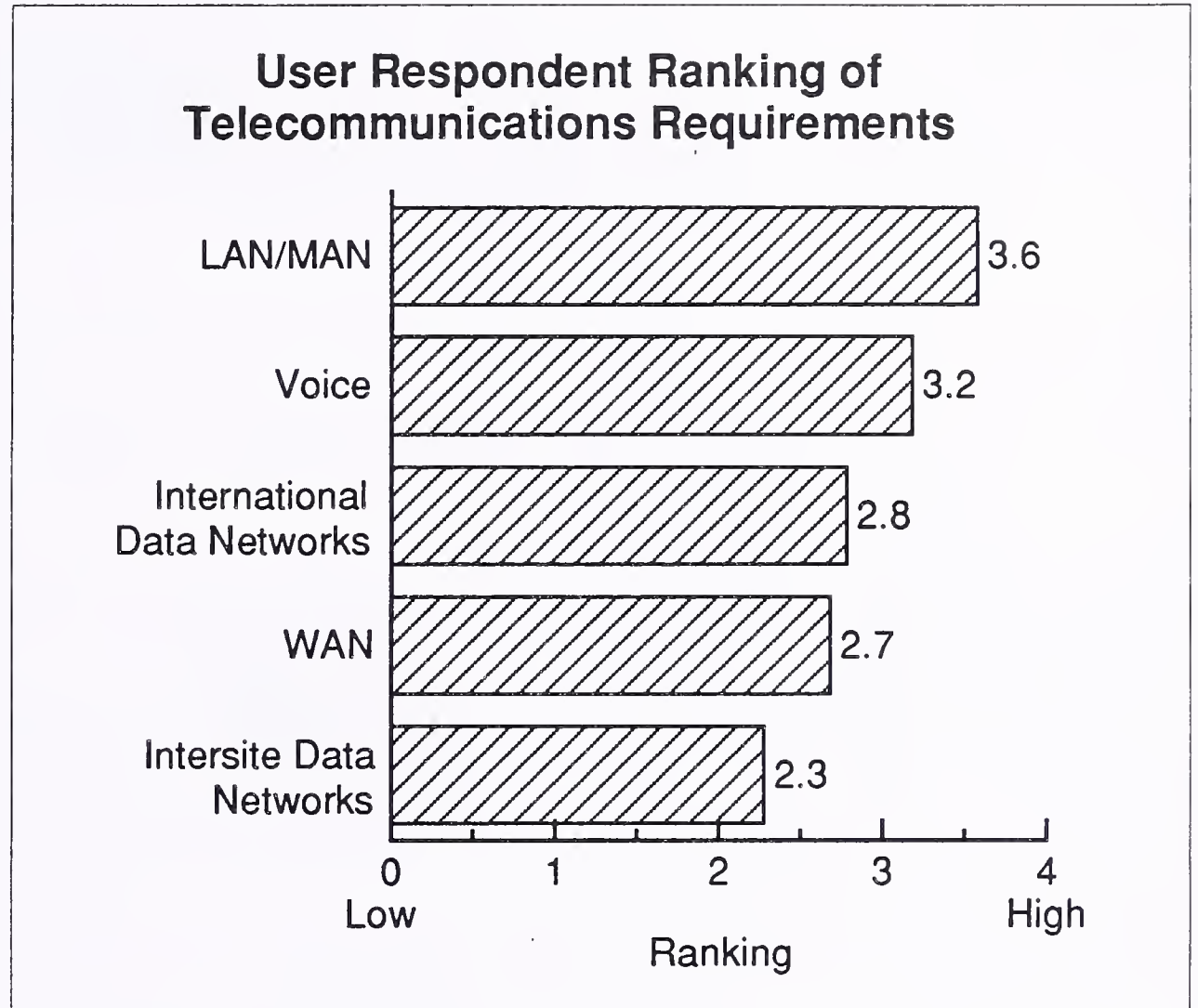
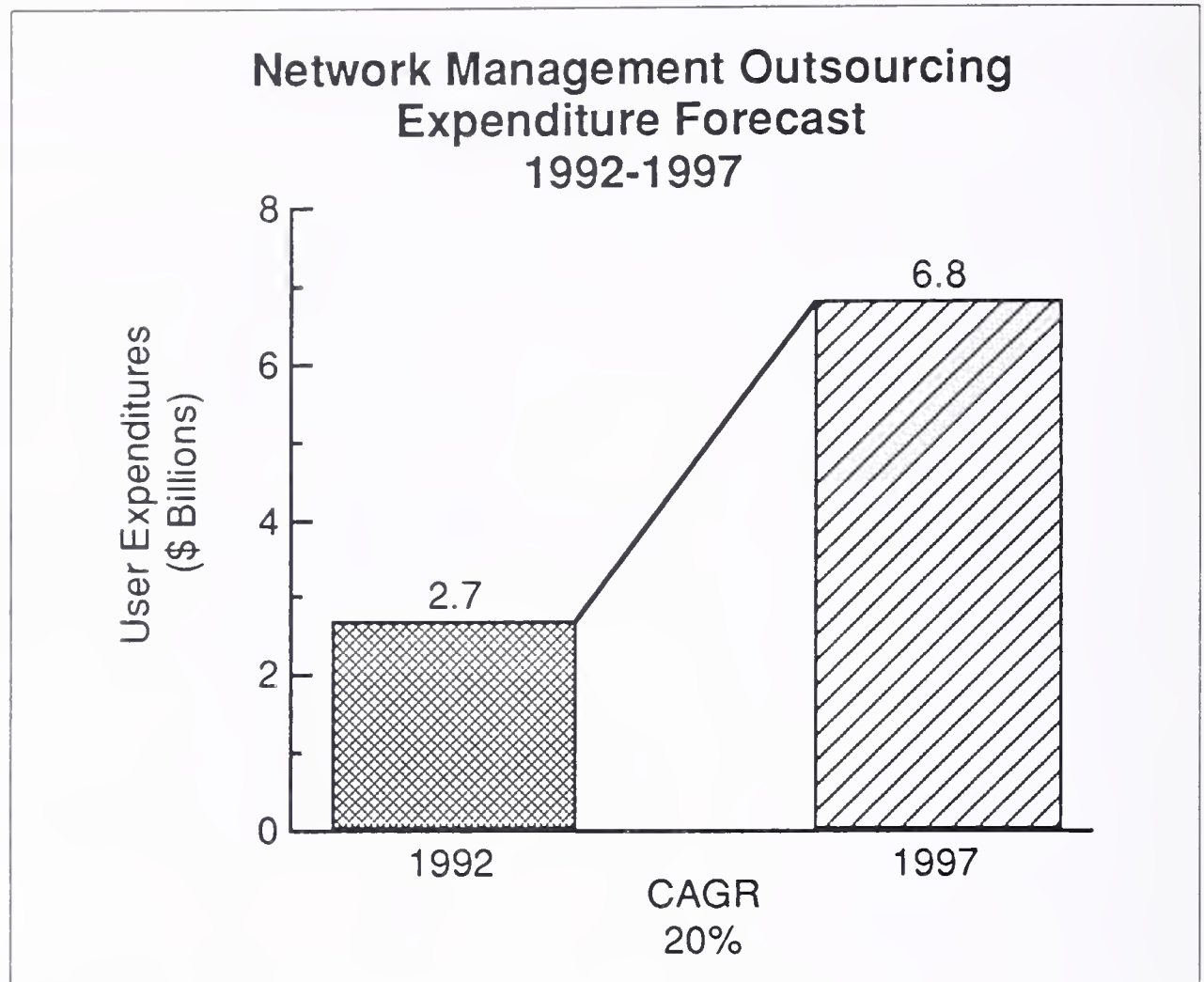


EXHIBIT II-3



C

Vendor Perspectives and Strategies

Vendor perspectives on the changes in the network operations management arrangement over the next five years provide insight into user needs and suggests vendor strategies.

Exhibit II-4 is an overview of these perspectives.

Respondents are forecasting a shift to packet switch networks as the volume of network traffic increases and data, image and video transmissions increase their share of the currently voice-dominated network. Corporate usage of the public network, between remote sites, for high-speed data service (frame relay and switched multimegabit data services) will increase substantially at the expense of private networks.

These changes will increase the complexity of network management issues such as session management for voice, data, video and image sessions and the tighter management and integration of public/private hybrid networks.

EXHIBIT II-4

Changes in Network Operations Management, 1992-1997 (Vendor Respondents)

- Shift to packet switch networks
- Replacement of shared networks by private networks
- Control of virtual network through user workstations
- Market domination by carriers and large vendors
- Integration of systems and network operations management

The set up and control of a virtual network will move from carriers to users. Users will be able to control virtual networks from their workstations. This will be paced by the operating companies' capability to schedule dynamic virtual circuits, collect usage information and bill appropriately.

Respondents believe that the outsourcing market for network and systems management arrangements will be consolidated. The combined outsourcing market will be dominated by very large vendors, and the telephone companies will play an increasingly competitive role.

D

Market Trends and Issues

A highly competitive marketplace, two years of recession, downsizing trends and an information technology explosion have set the stage for increased user demand for network outsourcing. User issues accelerating the network outsourcing trend are summarized in Exhibit II-5 and discussed below.

- Users are highly motivated to focus their precious management and financial resources on their core business and contract other services to the experts.

EXHIBIT II-5

User Issues

- Increase focus on core business
- Reduce complexity of network and network management tools
- Reduce telecommunications expenditures
- Increase staff quality and reduce staff turnover
- Increase network availability and reliability

- The complexity of the telecommunications network and associated management tools is increasing as new technology and services become available and disseminated. This results in increased expense in staff training, network management software and hardware. Multivendor management problems still persist.
- Telecommunications expense reduction and cost containment are major user issues that are supported by user experience.
- Users lack the skilled personnel to manage their integrated voice and data network requirements. Attracting a high quality network staff, minimizing staff turnover, and career planning are key user issues that vendors are better positioned to meet.
- Outsourcing vendors can achieve increased levels of network reliability and availability 7 days a week, 24 hours a day across the user's enterprise. Vendors accomplish this reliability by practicing professional network management, using advanced networking protocols, and using standards that enable interoperation between multiple vendors' equipment.

E**Conclusions**

Exhibit II-6 summarizes network operations management user conclusions. A brief discussion of each point is included below.

EXHIBIT II-6

User Conclusions

- Significant cost savings
- Increased network reliability and availability
- Users satisfied
- Users focus on core business

- Expected annual saving in telecommunications expenses ranged from 5% to 25% and averaged 16%. Actual savings reported by users averaged 21%.
- Network outsourcing increases control over network reliability and availability. Reliable network services available 7 days a week, 24 hours a day are being realized by customers.
- All user outsourcing participants were either satisfied or highly satisfied with their network operations management vendor. These users reported that most of the benefits they anticipated either were met or are in the process of being realized.
- As telecommunications systems become more complex, users are finding themselves committing more resources to network management, thereby diverting scarce resources from their primary business.

INPUT believes that users are experiencing increased competition on a worldwide scale. The increased competitive environment is causing firms to focus on being the best at what they do. A major trend for companies to contract out aspects of their business that can be done more cost effectively by a specialized outside vendor is in process. Contracting has the benefit of providing more time to focus on users' primary business while saving money. It's a double win decision!

Vendor conclusions concerning network management outsourcing are summarized in Exhibit II-7 and discussed more fully below.

EXHIBIT II-7

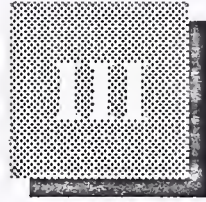
Vendor Conclusions

- Systems integrators in best market position
- Network outsourcing demand increasing
- LANs and voice networks most in demand
- Majority of network outsourcing users also outsource platform operations

- Systems integrators are perceived by users to be the best positioned to meet users' network operations management requirements. Users scored systems integrators as being able to meet 68% of their requirements. The nearest score was 63% for an alliance between a systems integrator and a common carrier. Hardware vendors, with a score of 53%, was the highest scoring vendor category that didn't include systems integrators.
- Trends in data center downsizing, client/server LANs and interconnection of local-area and wide-area networks will continue to increase the users' emphasis on the network and outsourcing alternatives.
- Users ranked LANs and voice networks as their highest network requirement, but only 71% of vendor respondents include LANs and 50% include voice networks as part of their network operations management arrangement.
- Fifty-seven percent of users that outsource their networks also outsource their data center operation. Seventy-five percent of these firms used the same vendor for both arrangements.

During the 1980s, leading computing vendors concluded that the "network was the solution." LANs penetrated the user community, empowering PCs with access to corporate data. More recently, client/servers and distributed processing trends further empowered user departments to create and manage departmental information systems. These departmental computing systems are now being integrated with facsimiles, voice boards, PBXs and central-office switches that combine the advantages of voice, data and image information. These call processing centers serve to increase the user department's revenue and enhance customer service levels.

Increasingly, the distributed computing and telecommunications network is becoming synonymous with the corporate computing environment. Professional management and control is essential for this environment. This is the outsourcing opportunity!



Market Characteristics

The network outsourcing management arrangement is a long-term partnership between a company and its vendor. In order to get a broad perspective on the current status and future growth of this business segment, INPUT focused its research on companies that have a wide range of voice and data requirements—based on their size, industry and previous experience with network management outsourcing.

A

User Characteristics

This section covers respondent demographics, telecommunications organization and outsourcing experience. Respondents' annual revenues ranged from \$14 million to \$38 billion and employees ranged from 200 to over 130,000. Respondents averaged \$8.7 billion revenue and 32,000 employees.

The largest concentration of respondents (29%) were from the banking and finance industry. Energy firms represented 12%, and the remaining firms came from several industries, including information technology, chemicals, wholesale trade, engineering, insurance and advertising.

Over 70% of respondents had a single organization responsible for voice and data requirements. Most of the remaining 29% believed that within five years one organization would have responsibility for all telecommunications requirements, as shown in Exhibits III-1 and III-2.

EXHIBIT III-1

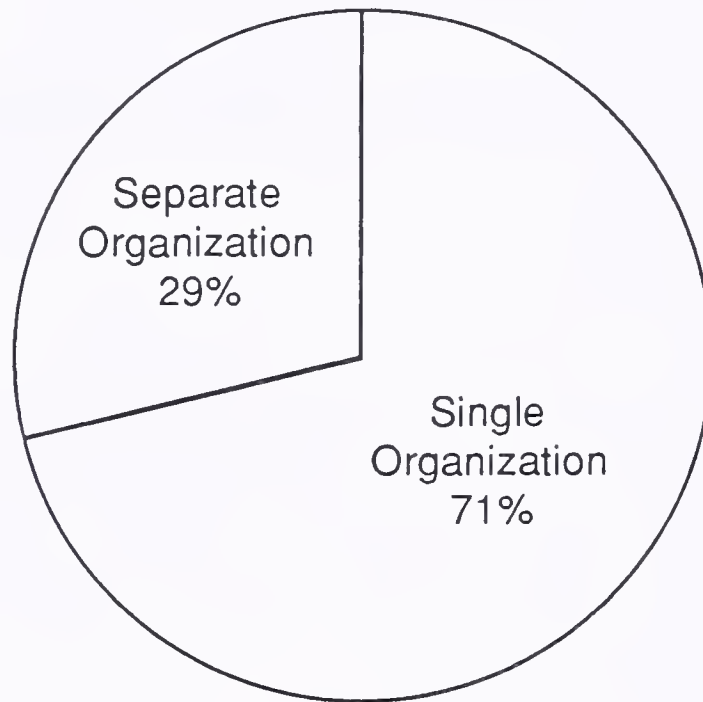
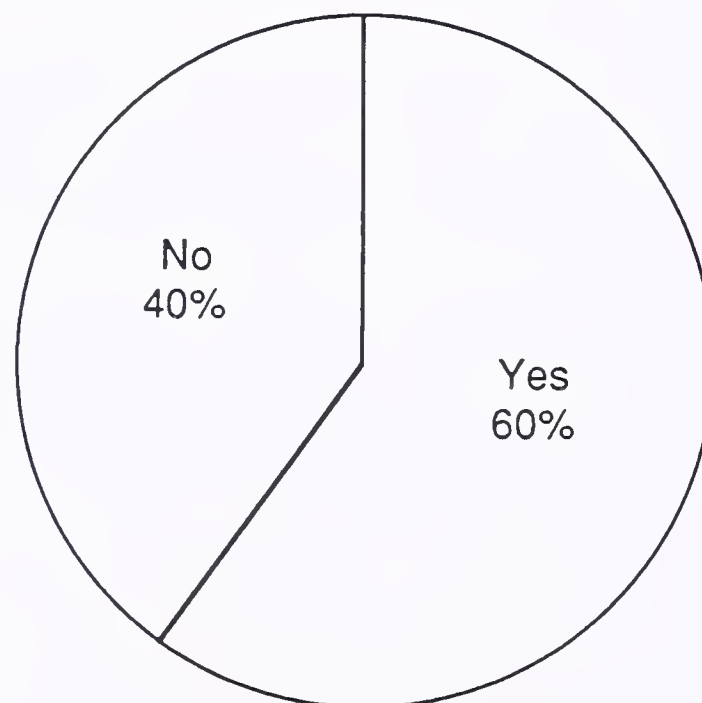
**Single User Organizations for
Voice and Data Now**

EXHIBIT III-2

**Single User Organization for Voice and Data
Network Management within Five Years**

Respondents with Separate Voice and
Data Organizations

User respondents were asked to describe the ways in which they integrate or separate their requirements for voice, data, video and image communications. Exhibit III-3 is a summary of user responses that focused on the integration of voice and data in their firms.

EXHIBIT III-3

Single Organizations Provide Voice and Data Integration Methods

- Common voice and data lines
- Voice and data integrated at the physical transport level
- Common switch for data and voice
- Financial responsibility integrated
- Centralized analysis and design
- Integrated WAN provides voice, data and image
- Integrated staff only
- Integrated organizationally with backbone network

Exhibit III-4 is a summary of user responses from companies that separate voice and data. Users believe that the technologies will become integrated as access to switched digital service, LANs, video, imaging and other high-speed voice/data transmission becomes more cost effective.

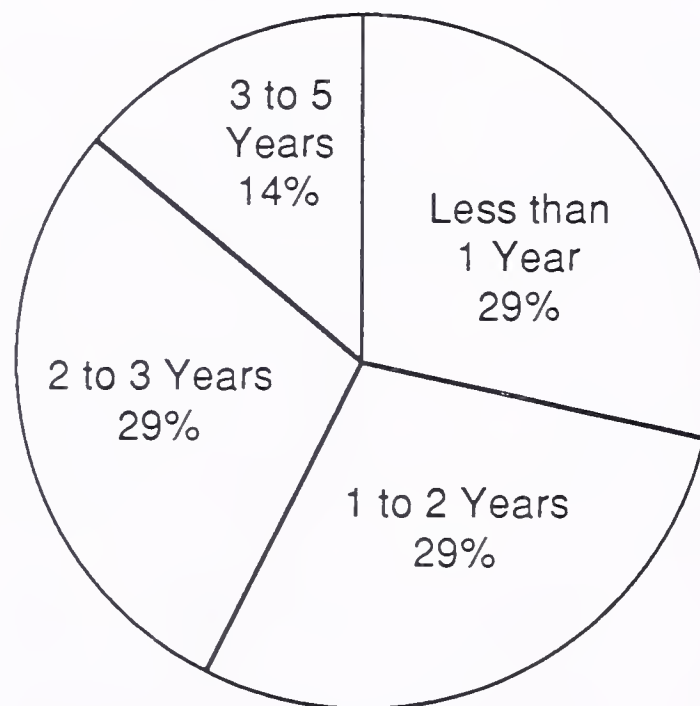
EXHIBIT III-4

Separate Voice and Data Organizations

- Separate lines for voice and data
- Separate infrastructure for network and desktop
- Separate installations project groups

Of the respondents using a network outsourcing vendor, 58% had less than two years' experience with their outsourcing vendor. However, 14% had over three years' experience, as shown in Exhibit III-5.

EXHIBIT III-5

Respondents' Outsourcing Experience*

Outsourced Managed Respondents

*May not add to 100% due to rounding.

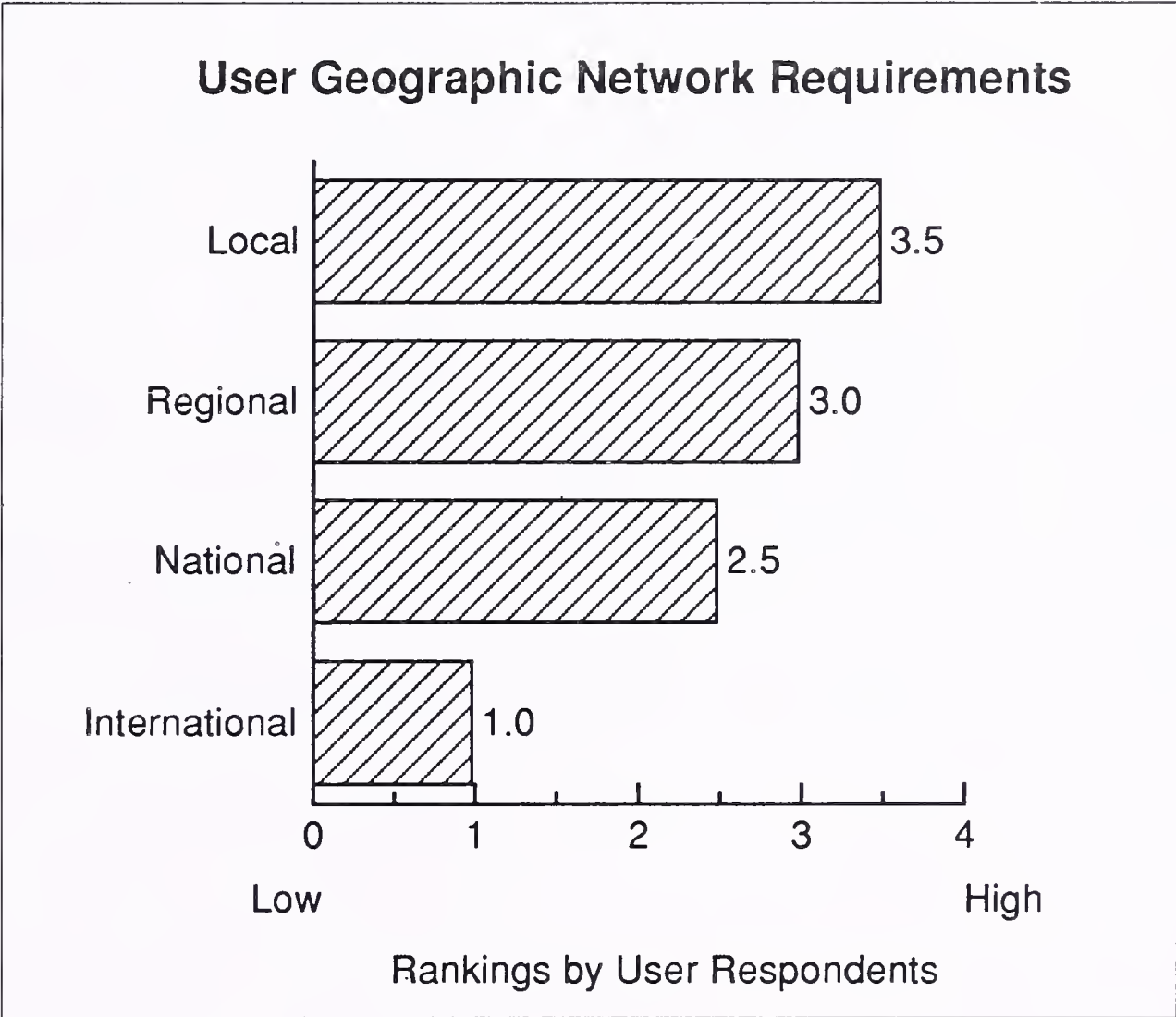
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User Requirements

This section analyzes user respondent geographic network requirements, telecommunications budgets by type and functions provided, and rationale for continuing in-house management of their network operations.

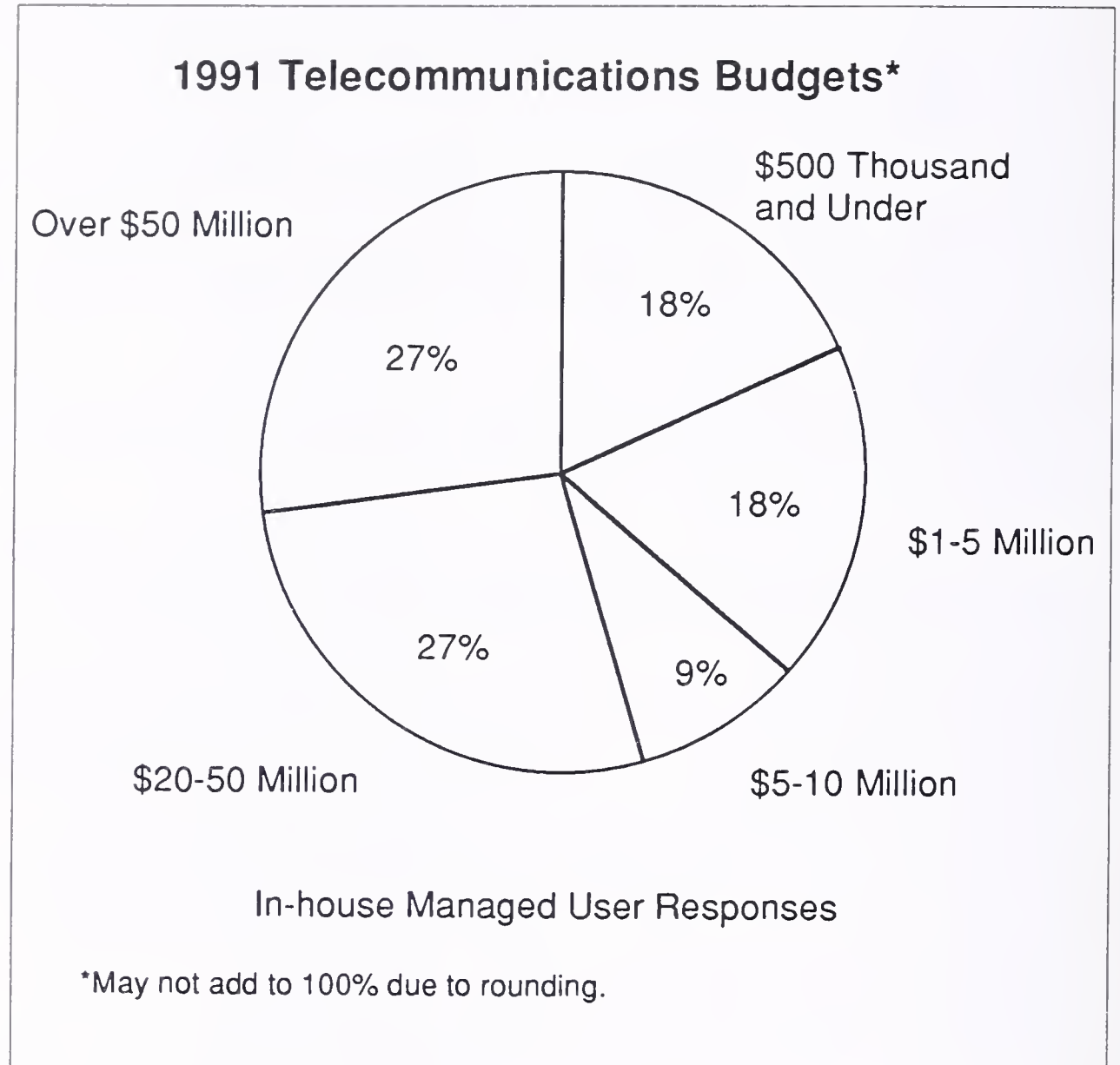
Respondents ranked their geographic requirements as local first, then regional, national and international. There was a wide range of responses, as many users considered local through regional requirements a must. International was more important to firms that outsourced their network, but still trailed the others in ranking. See Exhibit III-6.

EXHIBIT III-6



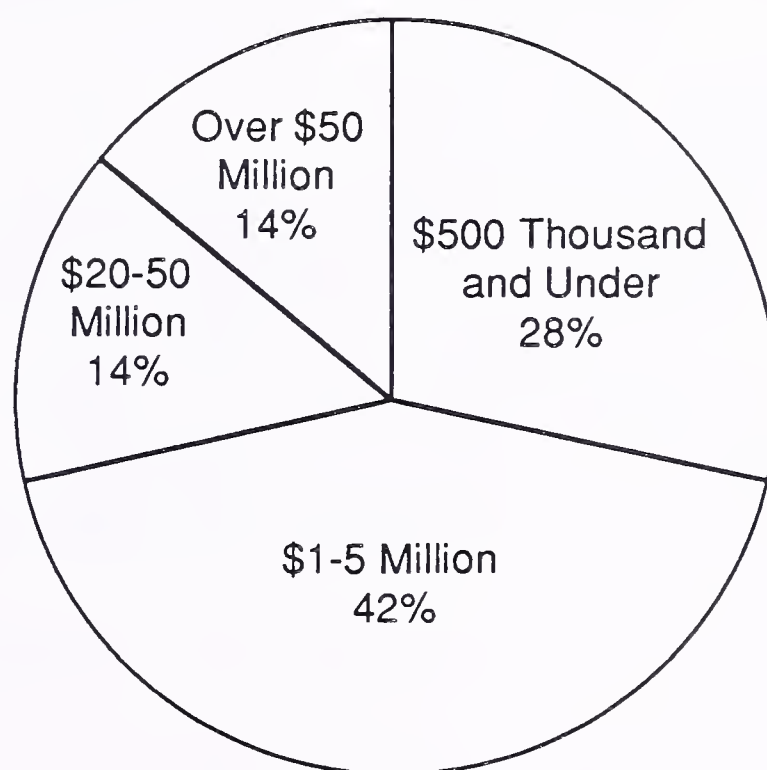
Over half (54%) of the respondents that managed their telecommunications requirements in-house reported annual telecommunications expenditures over \$20 million. Twenty-seven percent reported over \$50 million per year. Exhibit III-7 details budgeted 1991 expenses.

EXHIBIT III-7



These same expense budgets were requested of respondents that outsourced their network requirements, prior to contracting with their outsourcing vendor. In these cases, 70% of the respondents spent \$5 million or less for telecommunications expenses, while 28% reported annual telecommunications expenses over \$20 million before their outsourcing contract started, as shown in Exhibit III-8. INPUT concludes that users with smaller network requirements have been more willing to outsource these activities.

EXHIBIT III-8

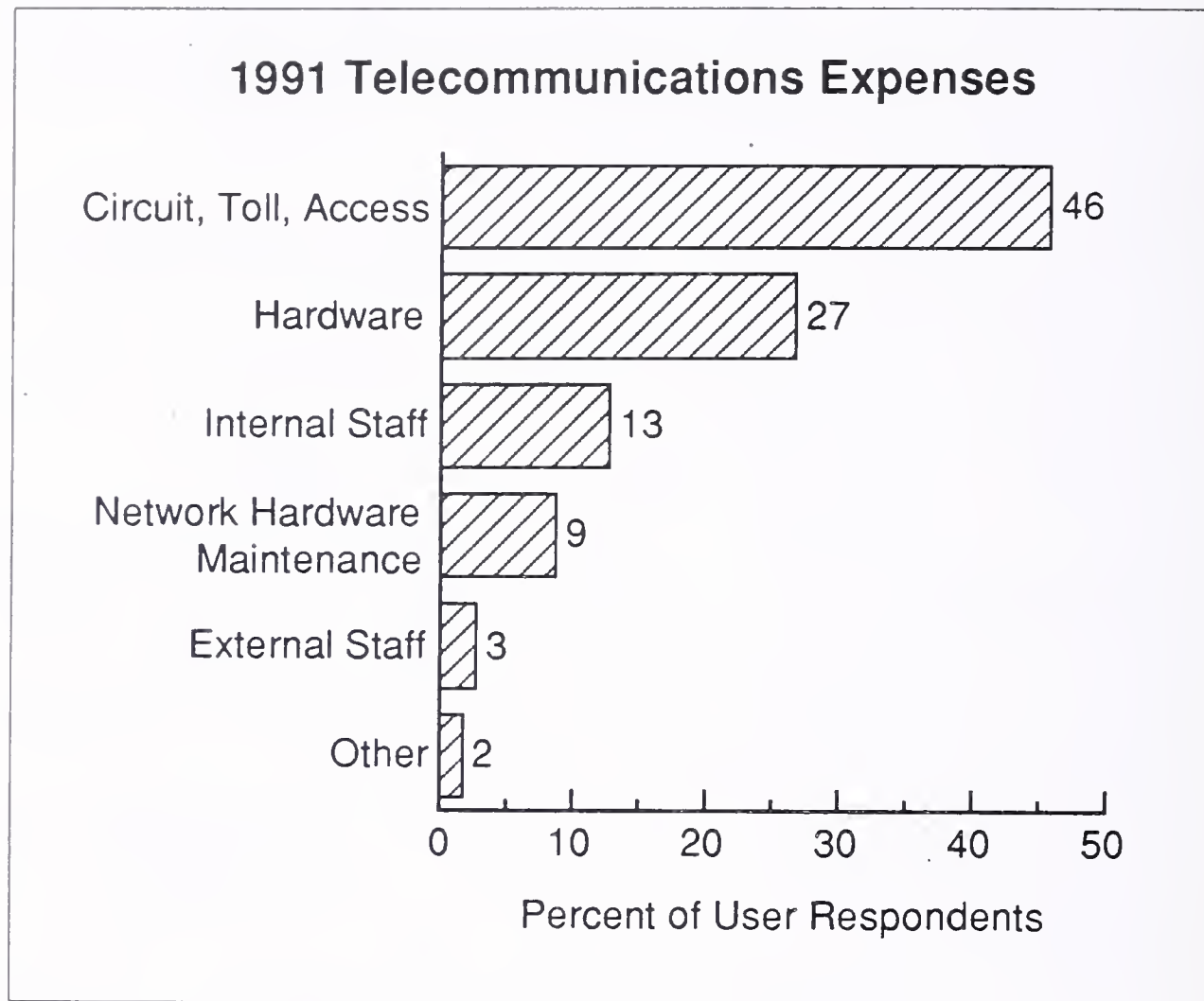
1991 Telecommunications Expenditures*

Outsourced Managed User Responses

*May not add to 100% due to rounding.

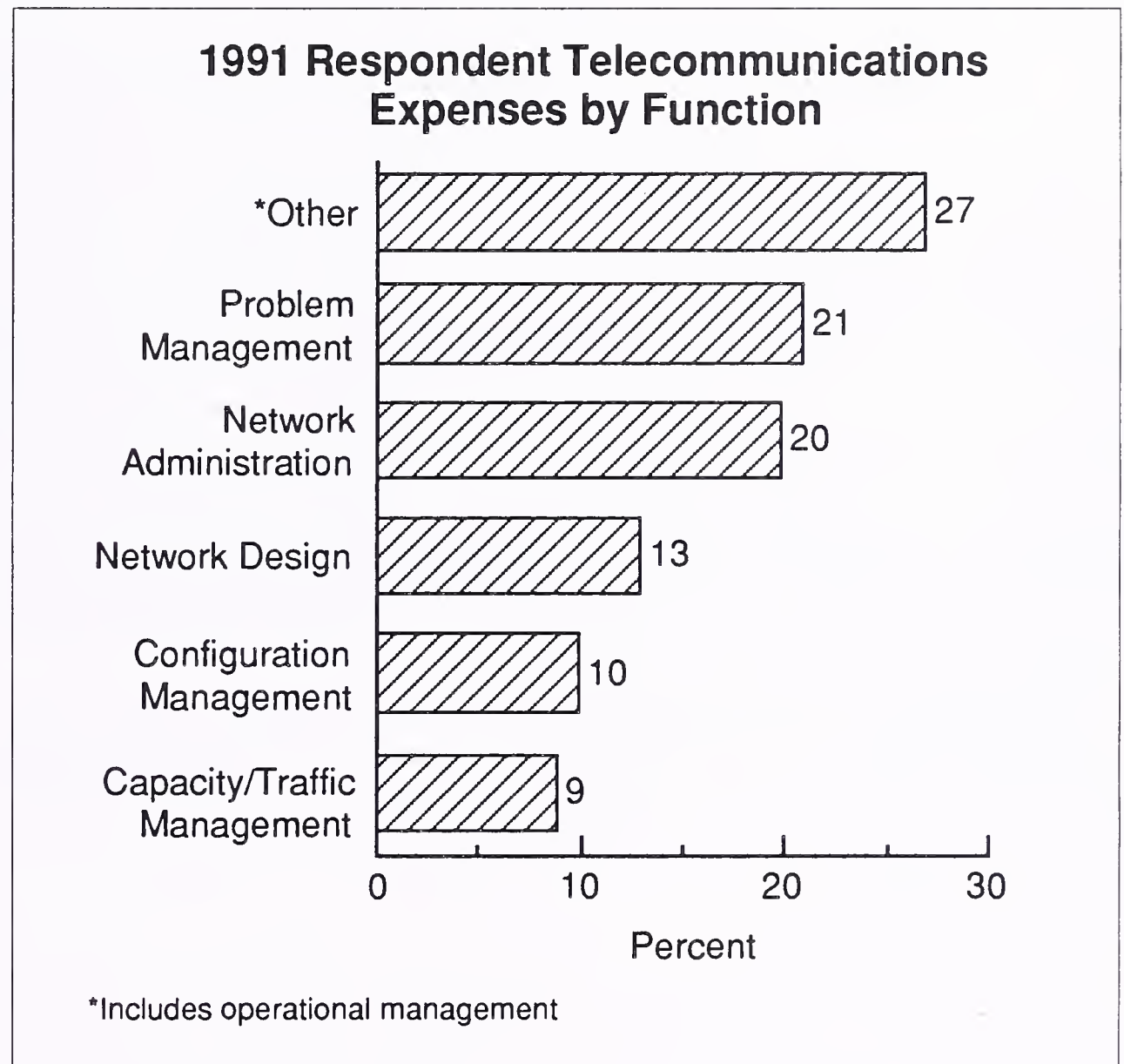
In 1991 internally managed user respondents spent 46% of their telecommunications budgets on circuit, toll and access charges, 27% on telecommunications hardware including maintenance, and 16% on staff. Exhibit III-9 highlights these expenses in greater detail.

EXHIBIT III-9



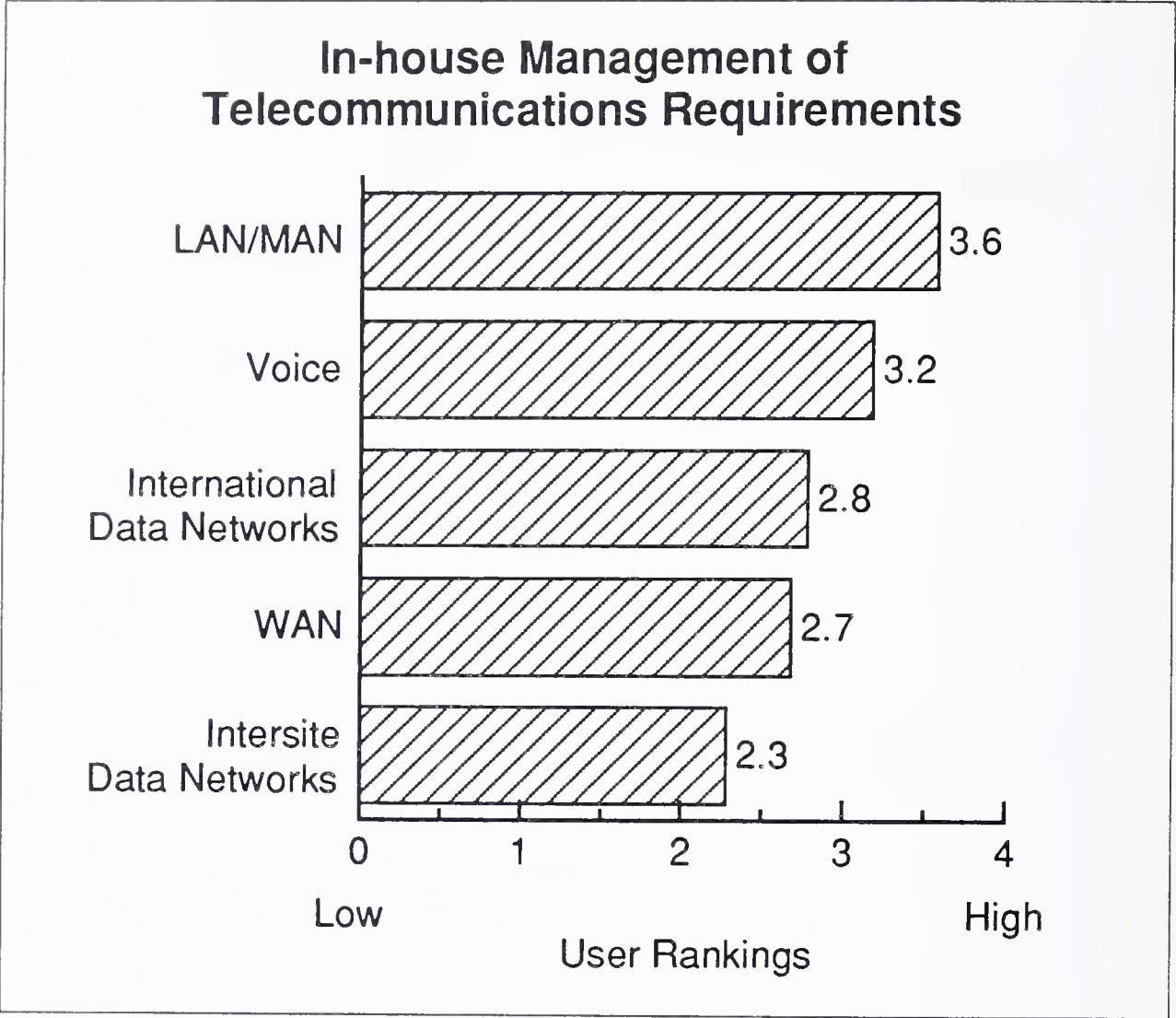
User respondents with in-house network management segmented their 1991 telecommunications expenses into specific functions. Many respondents included operational and program management functions in the "other" category, accounting for 27% of telecommunications expenses. If added to the 21% in problem management, this combined expense (problem and operational/program management) accounted for 48% of 1991 telecommunications expenses. Network administration, design, configuration and capacity management functions accounted for the remaining 52%. These functions are detailed in Exhibit III-10.

EXHIBIT III-10



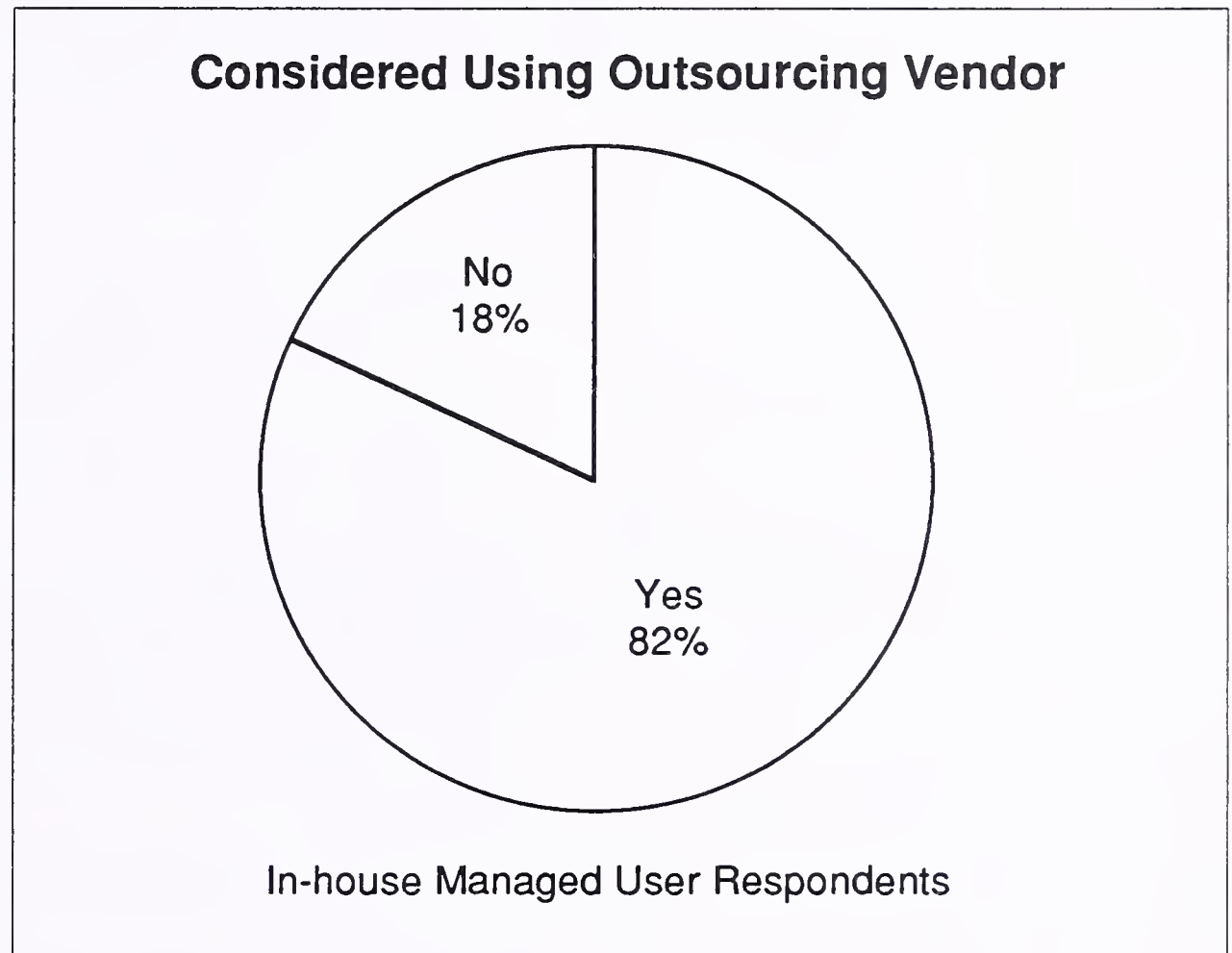
Respondents ranked local- and metropolitan-area networks as their single most important network service. Voice was number two, followed by international data networks, wide-area networks, and intersite data networks. Preference varied widely by firm. Exhibit III-11 clearly shows the strategic importance of LANs to respondents.

EXHIBIT III-11



As Exhibit III-12 shows, 82% percent of the respondents currently managing their network in-house considered outsourcing all or part of their telecommunications networks.

EXHIBIT III-12



The primary reasons for continuing with in-house network management are highlighted in Exhibit III-13. Several firms are in a gradual transition or actively evaluating outsourcing their network.

EXHIBIT III-13

User Respondent Reasons for In-house Management of Networks

- Gradual transition to outsourcing
- Not in our best business interest
- Local requirements only
- Services offered not useful
- Credibility with customers
- Proprietary architecture
- Assurance of ongoing savings
- Network outsourcing is being considered
- In-house networking preference
- Network considered a strategic asset

Eighteen percent of the user respondents have not yet considered outsourcing their network. The reasons given included:

- “Vendors are motivated to grow network and bandwidth versus manage what we have in a cost-effective manner. This would have to change for us to consider outsourcing.”
- “We will consider outsourcing when our networks grow beyond our present capabilities.”

C

User Experience

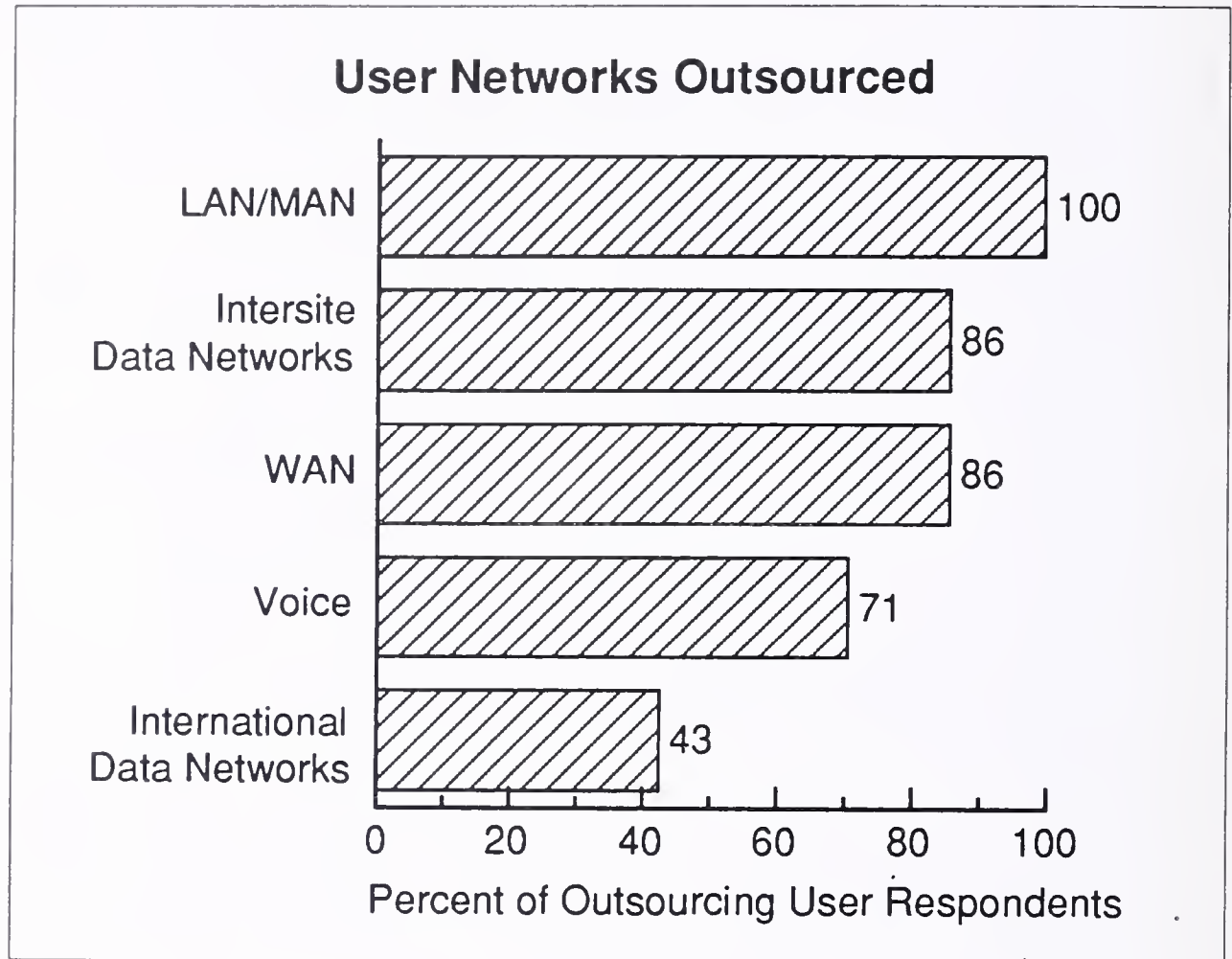
The analysis and corresponding charts in this section represent actual user outsourcing experiences. Responses are from users that are currently outsourcing all or part of their telecommunications network.

The user experience section includes:

- Types of networks outsourced
- Functions provided
- Percent of telecommunications budget under contract
- User savings
- User satisfaction
- User benefits from network outsourcing
- Users outsourcing both network and platform
- Vendor qualifications sought
- Users perception of leading vendors
- Users views on vendor alliances
- Ranking by type of vendor
- User decision makers

Respondents that outsourced their networks always included LANs/MANs in their vendors' contracts. Intersite data networks and WANs were included by 86% of respondents, voice by 71% and international data networks by 43% of respondents' vendor contracts, as shown in Exhibit III-14.

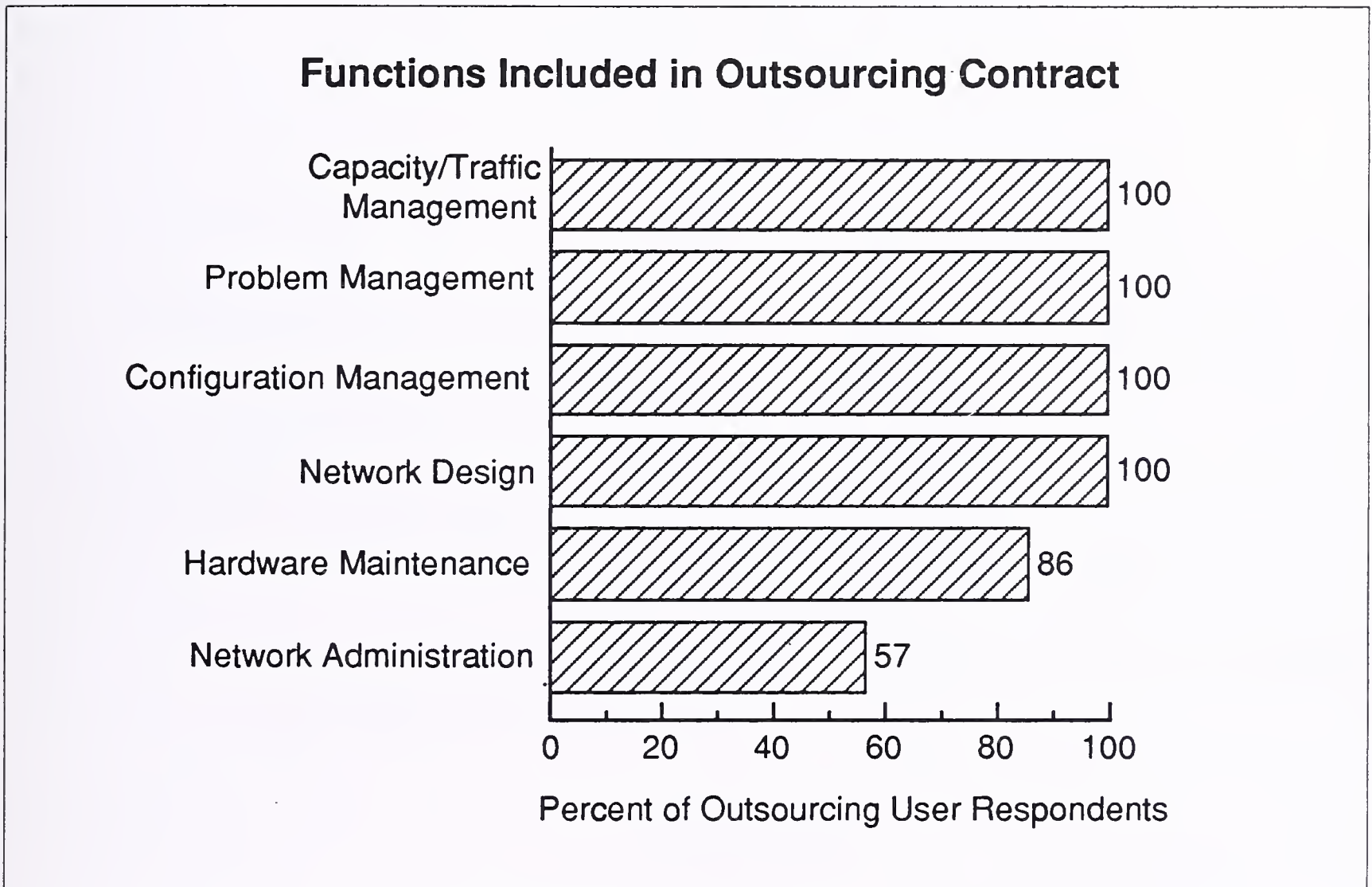
EXHIBIT III-14



Respondents reported their outsourcing contract term ranged from two to ten years, with the average contract term six years. This pattern is similar to the pattern evident in platform outsourcing contracts.

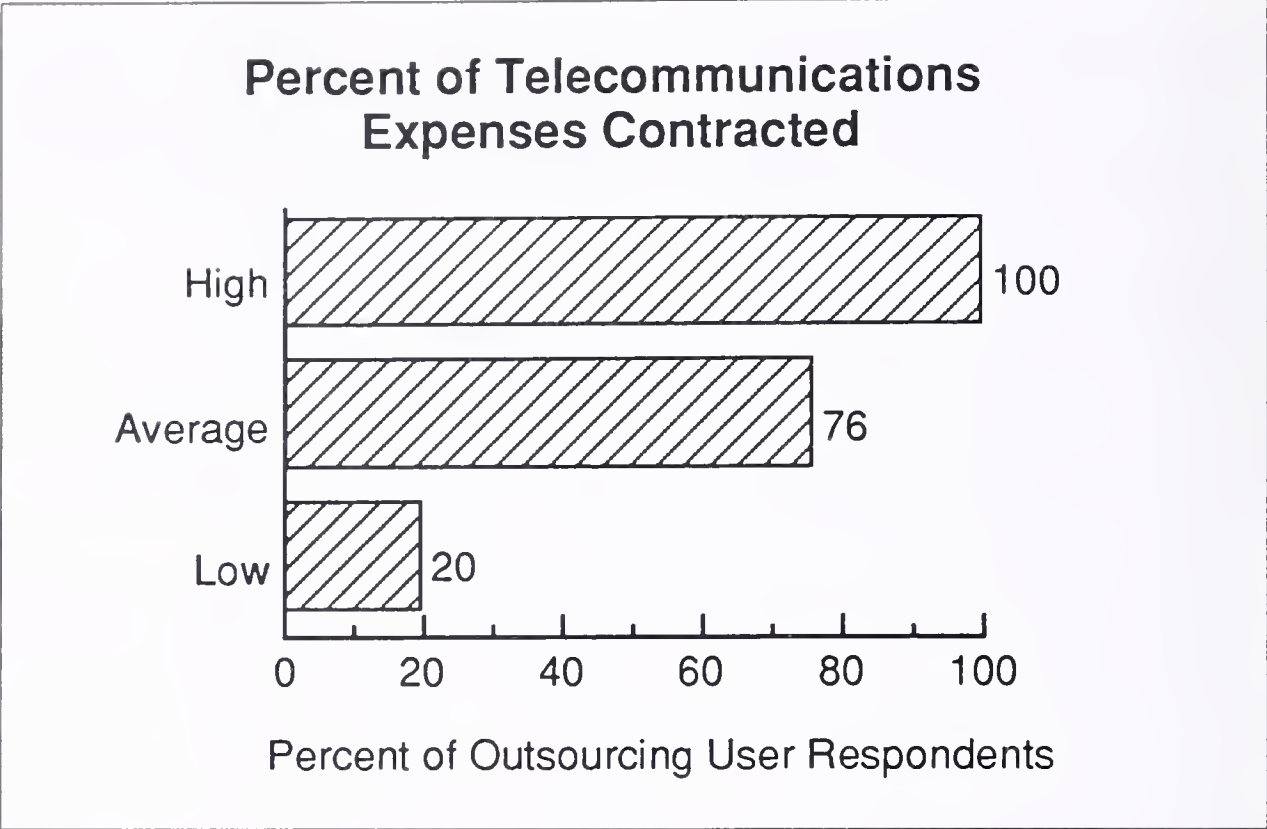
Exhibit III-15 shows the functions included as part of the contract with outsourcing vendors. Capacity/traffic management, network design, problem management and configuration management were always included in the respondents' agreements. (Please refer to Appendix A for INPUT's definition of these functions.)

EXHIBIT III-15



The percent of total telecommunications expenditures under an outsourcing contract ranged from 20% to 100%. As Exhibit III-16 shows, the average contract accounted for 76% of telecommunications expenditures. The remaining telecommunications expenses were managed in-house.

EXHIBIT III-16



The expected annual savings in telecommunications expenses ranged from 5% to 25%. Overall, Exhibit III-17 shows that respondents expected an average savings of 16%. Several respondents reported actual 1991 savings of 20% or better due to outsourcing their telecommunications network.

EXHIBIT III-17

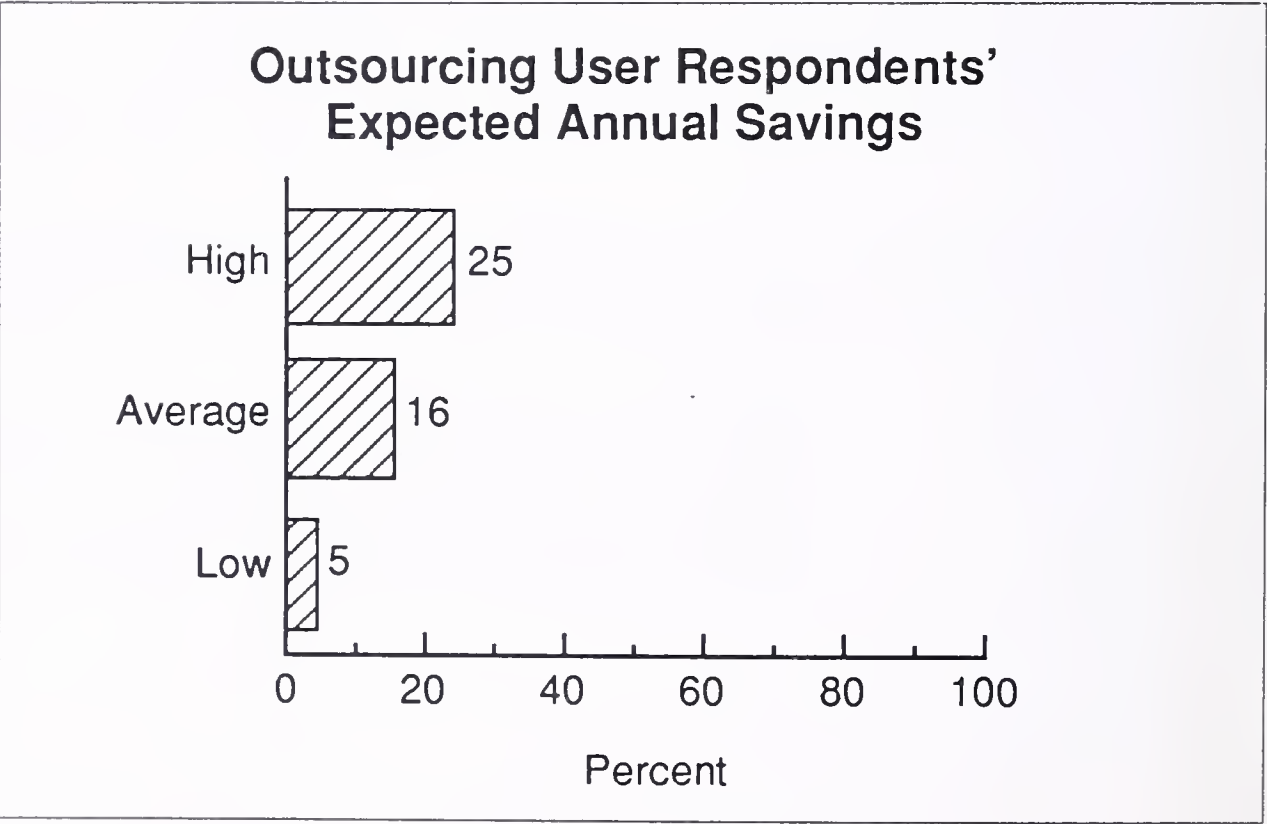


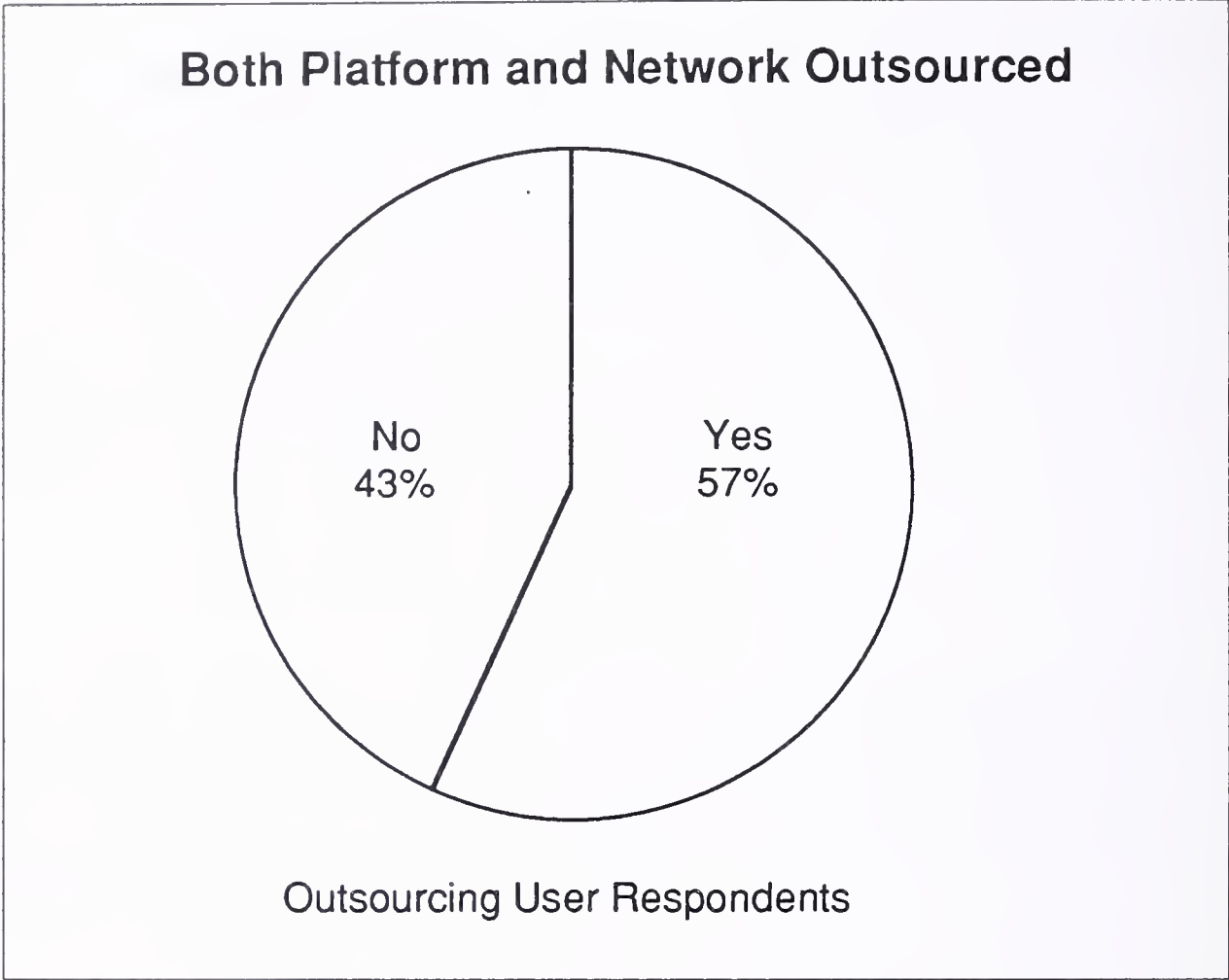
Exhibit III-18 shows that all respondents were either highly satisfied (43%) or satisfied (57%) with their network management outsourcing vendor.

EXHIBIT III-18



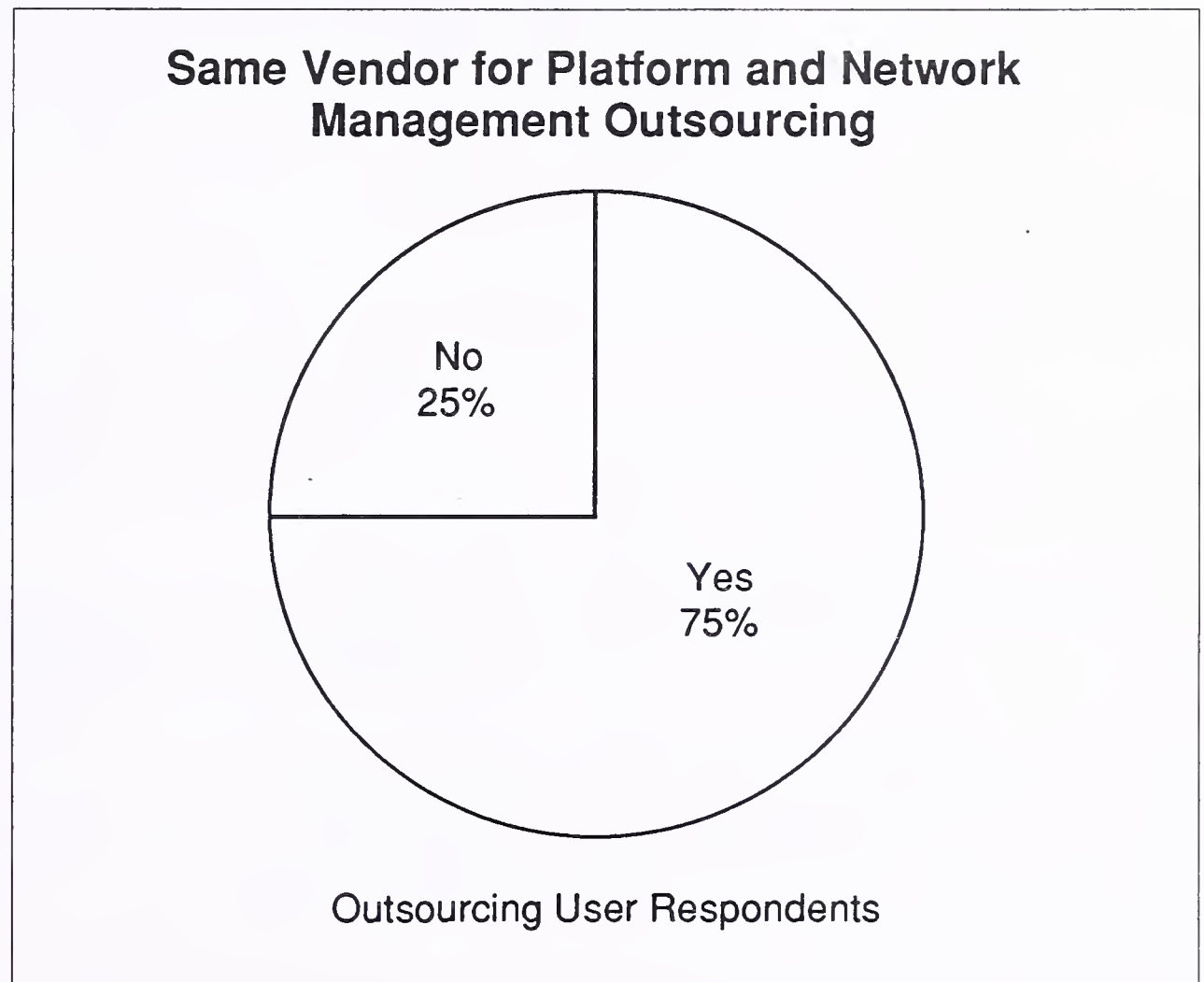
Fifty-seven percent of the respondents with outsourcing contracts for their network also outsource their information processing operations (platform), as illustrated in Exhibit III-19.

EXHIBIT III-19



In these cases, 75% of the respondents use the same vendor for platform and network management outsourcing, as shown in Exhibit III-20.

EXHIBIT III-20



The reason stated for not using the same vendor for both was that "we selected each firm based on their respective expertise in each area."

The users' propensity for outsourcing both network and platform arrangements from the same vendor represents an opportunity for vendors to increase revenue and profits. INPUT believes the users' desire to outsource both their network and platform will encourage more vendor teaming arrangements, alliances and acquisitions as vendors broaden their market focus. Outsourcing clients reported that most of the benefits they anticipated, as shown in Exhibit III-21, either have been met or are in the process of being realized.

EXHIBIT III-21

User Benefits from Network Outsourcing
(Based on Responses from Users with
Outsourcing Contracts)

- Cost savings
- Improved service availability and reliability
- Future technology positioning
- Professional management for resources and capital equipment
- Staff continuity and professional growth
- Reduced risk
- Focus on strategic business operations
- Global network expansion

Users' decision to outsource their networks involved financial and strategic considerations. Ninety-four percent of respondents considered the decision to outsource to be financial, and 41% of respondents considered the decision to be both financial and strategic, as illustrated in Exhibit III-22.

EXHIBIT III-22

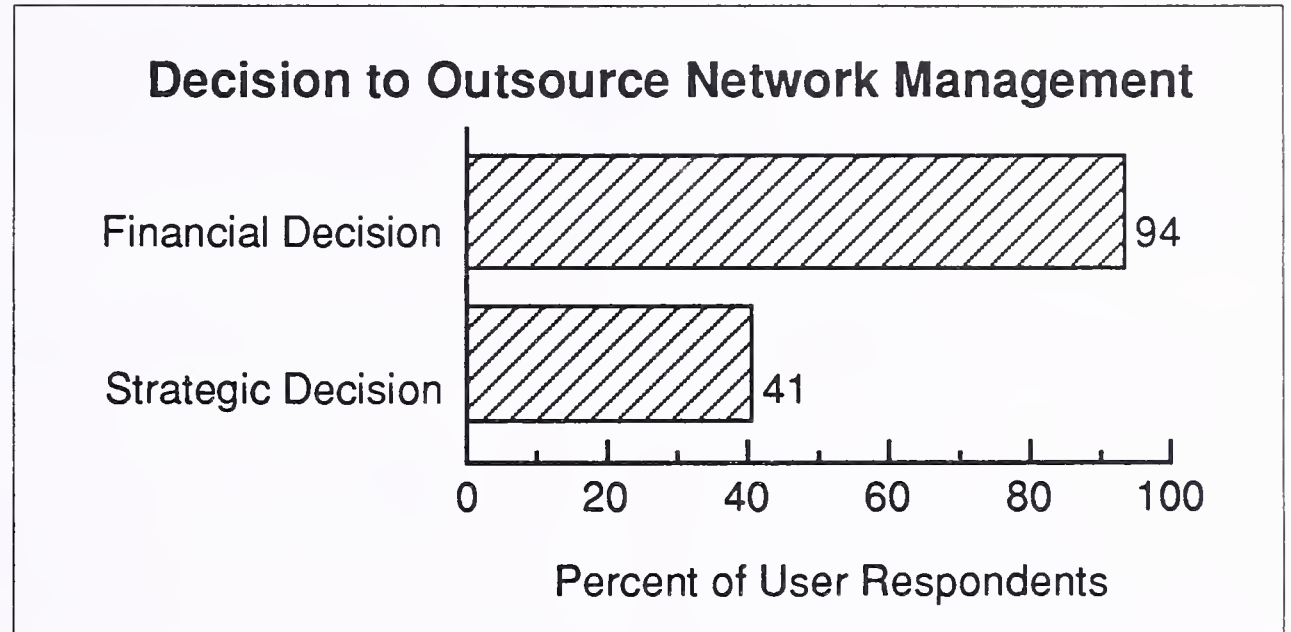


Exhibit III-23 highlights the respondents' strategic reasons for network management outsourcing.

EXHIBIT III-23

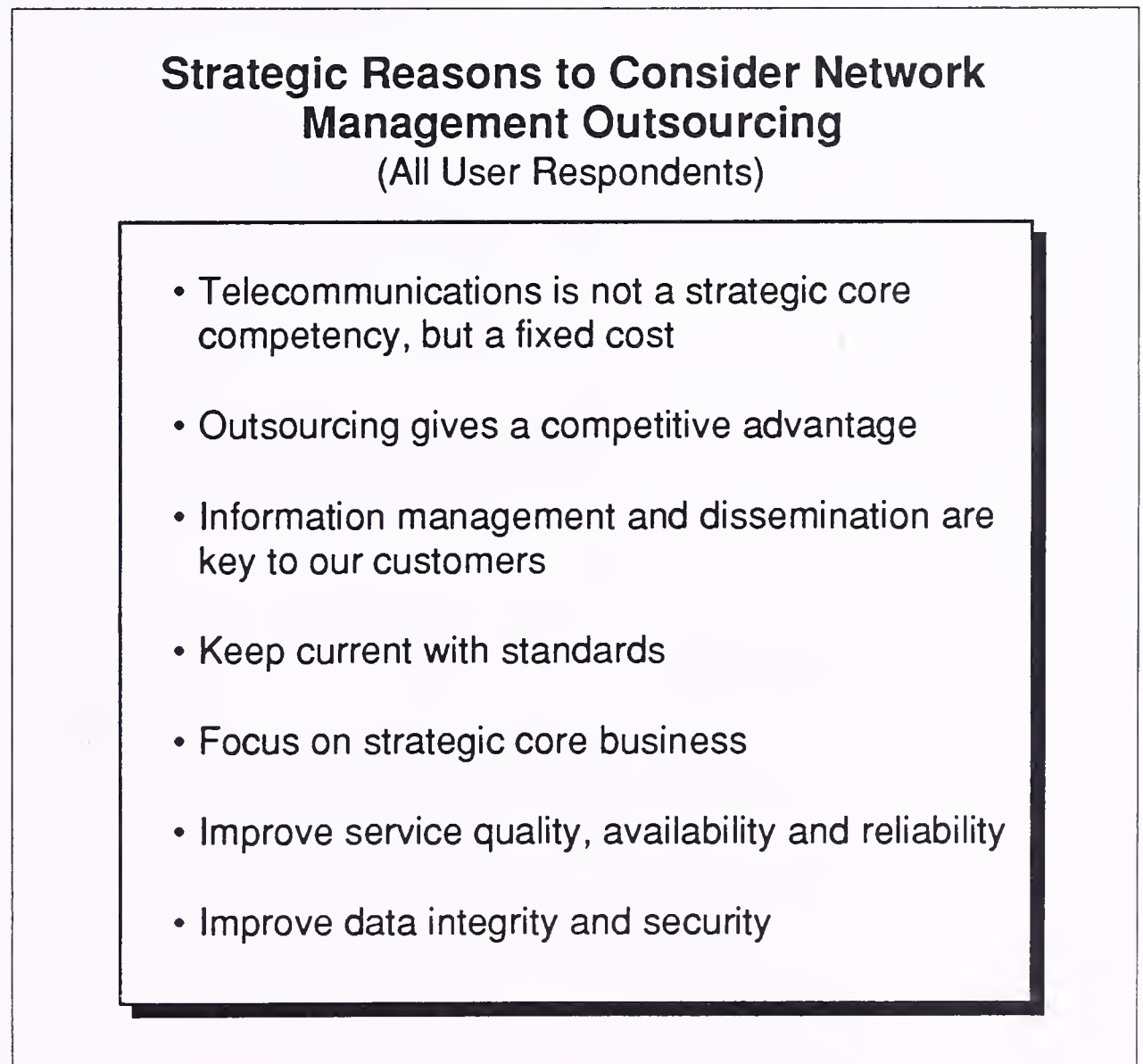


Exhibit III-24 highlights the vendor qualifications that users are seeking. The responses imply that vendors must seek out strategic partners or make acquisitions to meet the level of services sought by users.

EXHIBIT III-24

Vendor Qualifications (User Respondents)

- World-class service provider
- International presence
- Telecommunications expertise in managing voice and multiprotocol data environments
- End-to-end control over the physical and logical network
- Responsibility for all embedded equipment
- Track record and reputation in industry
- Financial stability
- Ethical service provider

User respondent perceptions of network outsourcing vendor strategies and unique strengths are shown in Exhibit III-25. EDS, IBM and AT&T were the vendors mentioned most frequently.

EXHIBIT III-25

Summary of User Perceptions of Vendors
(All User Respondents)

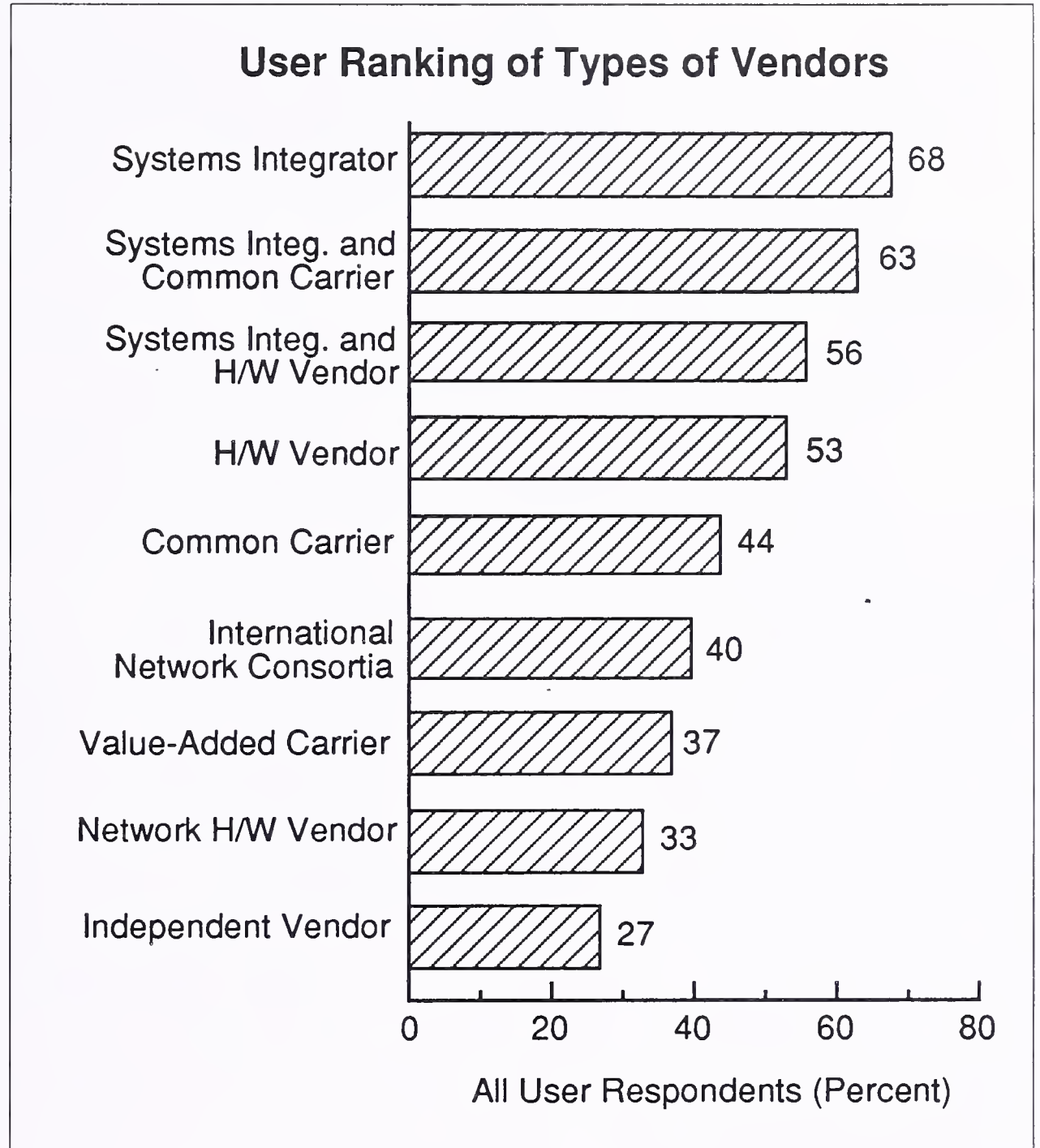
Vendor	# Mentions	Strengths	Strategies
EDS	9	Experience/reputation People & fin. resources Cost performance Diverse h/w platform Long outsourcing history	Total outsourcing solution
IBM	8	Experience/global outreach, cust. service Assimilation of staff Mainframe technology 1,000 multiprotocol world class, global routers SNMP, open systems Outsourcing is strategic	Varied approaches
AT&T	7	Network support resources Resources, skills, controls Established client base	Required subscriptions Customer service Economies of total package expansion
DEC	3	Pricing, world class	Teaming with business Outsourcing is strategic
MCI	2	Innovation	Customer service
HP	1	Presence, expertise	Open view, extensible SNMP
BT of NA	1	Customer base	Off-premise service
Syncordia	1		Global networking plans

Users' perspectives of network management alliances between vendors were generally positive, but it was clear that the results were not in yet. Users had mixed reactions as to the long-term strategic value versus short-term tactical benefit of teaming relationships between vendors, as the comments below illustrate.

- "Alliances appear to be short term to gain market share. The potential of long-term relationship is diminished since each large player wants to be in the total outsourcing business (information systems and telecommunications)."
- "Alliances are a sound approach to achieve long-term economies of scale. They can provide one-stop shopping for provisioning, equipment, network design and trouble shooting. They are needed to support future growth."
- "Alliances working but not well enough...have long-term potential...global alliances have trouble delivering today."
- "Alliances are short-term and tactical. Rapid technology changes and customer requirement changes will cause things that make sense today, less desirable tomorrow."

Respondents ranked different classifications of vendors based on each respondent's perception of the vendor's ability to meet their needs. System integrators scored the highest at 68%, followed by alliances of system integrators and common carriers at 63% and alliances between system integrators and hardware vendors, which scored 56%. Exhibit III-26 shows the average respondent score for each of nine vendor categories.

EXHIBIT III-26

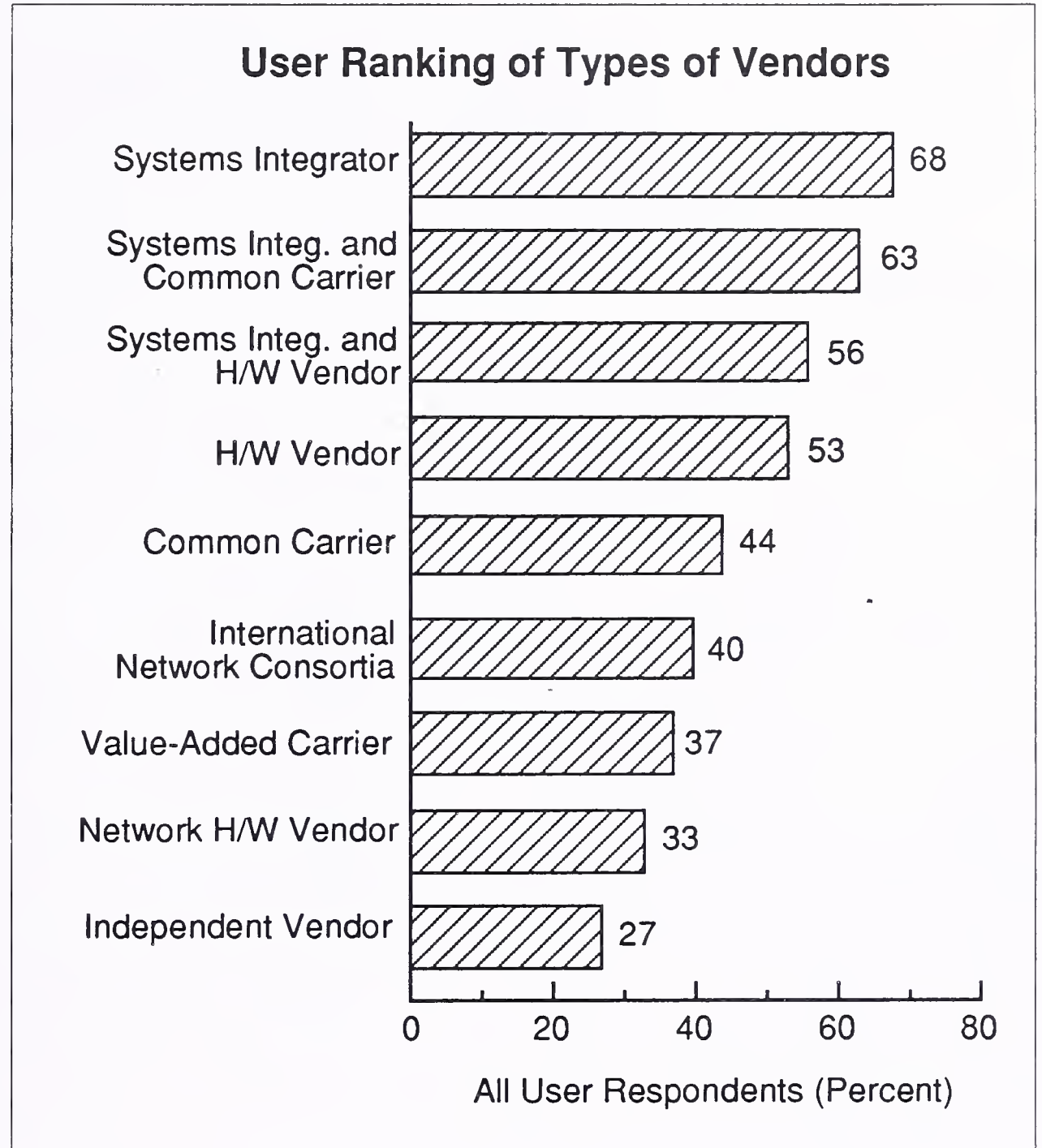


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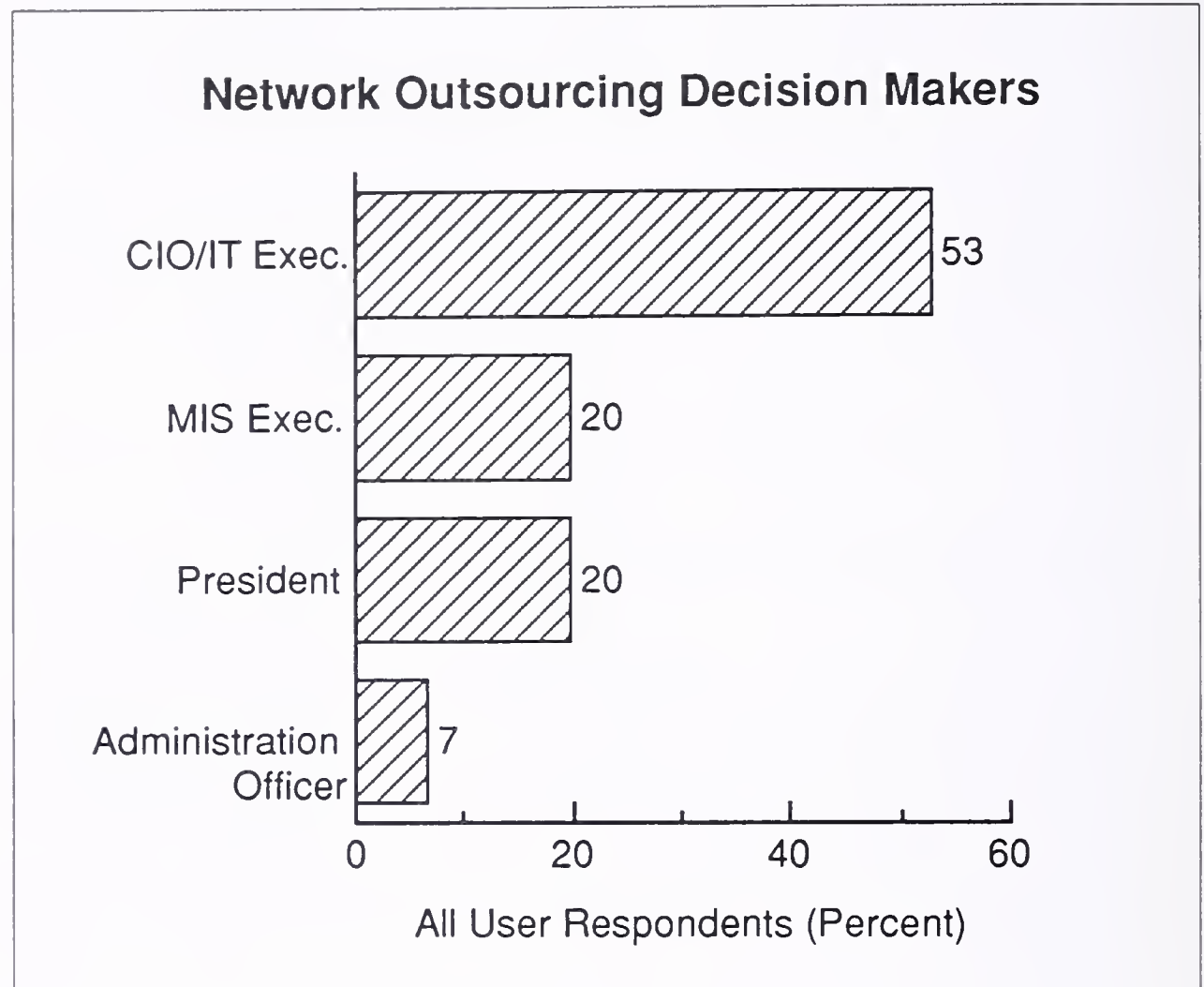
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EXHIBIT III-26



Who makes the decision to outsource network management? This question was asked of all user respondents; as expected, the responses varied by type and size of company. The CIO or information technology executive (or MIS director) represented 73% of the responses. Twenty percent of the respondents named the president and 7% identified another administrative officer as the decision maker, as illustrated in Exhibit III-27.

EXHIBIT III-27



D

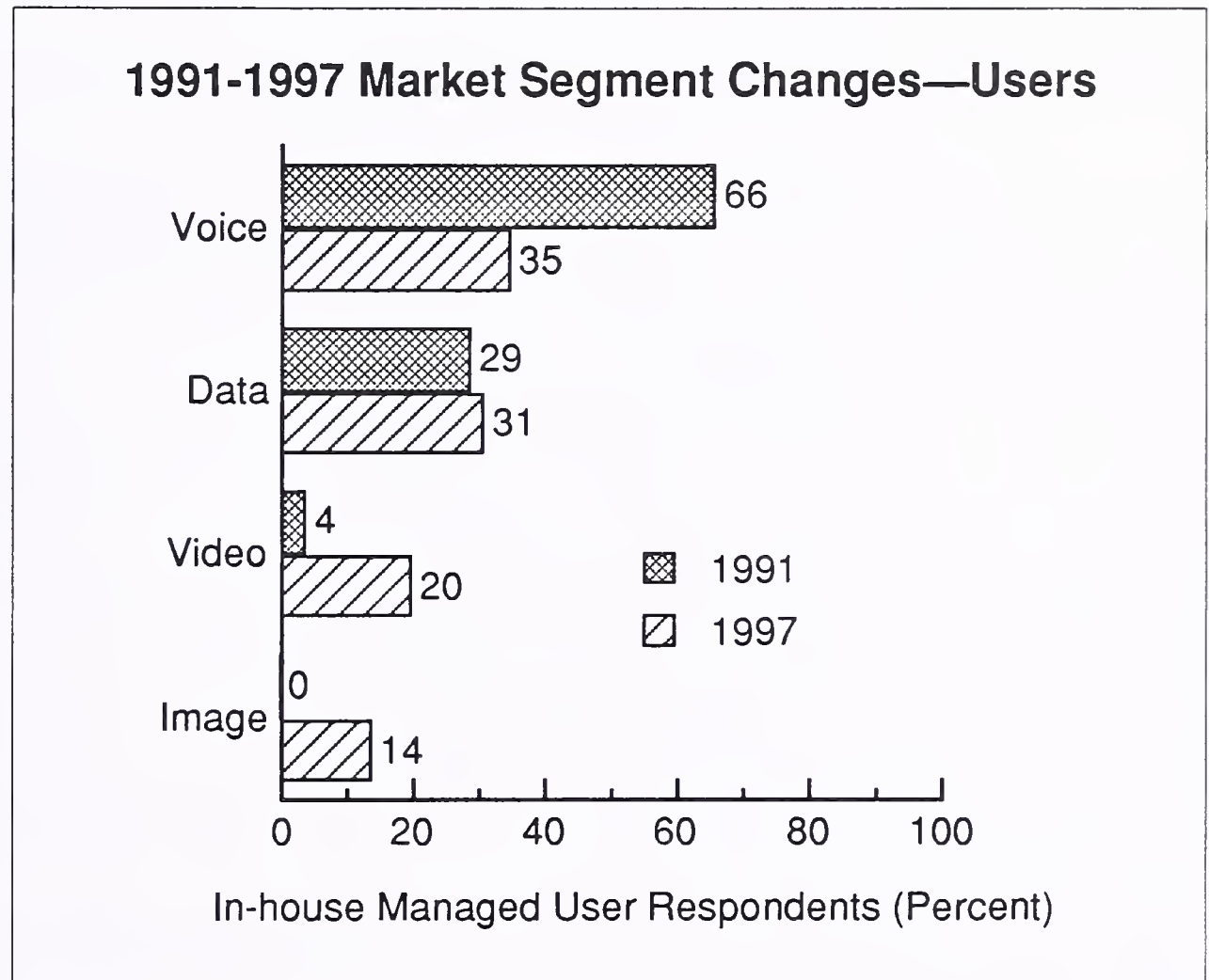
Market Segments (Data, Voice, Video and Image)

This section covers user and vendor estimates of current and expected user requirements and vendor network operations management revenues by market segment. A summary of vendor comments regarding the management of user market segment requirements is also included.

1. Telecommunications Market Segment Expenditures

User respondents reported their current telecommunications expenses and forecast their requirements for 1997. The group of in-house users spent 66% on voice, 29% on data and 4% for video communications in 1991. By 1997 these users forecast video and image will represent 20% and 14% respectively, while voice (35%) and data (31%) will share the remaining 66%. (See Exhibit III-28.)

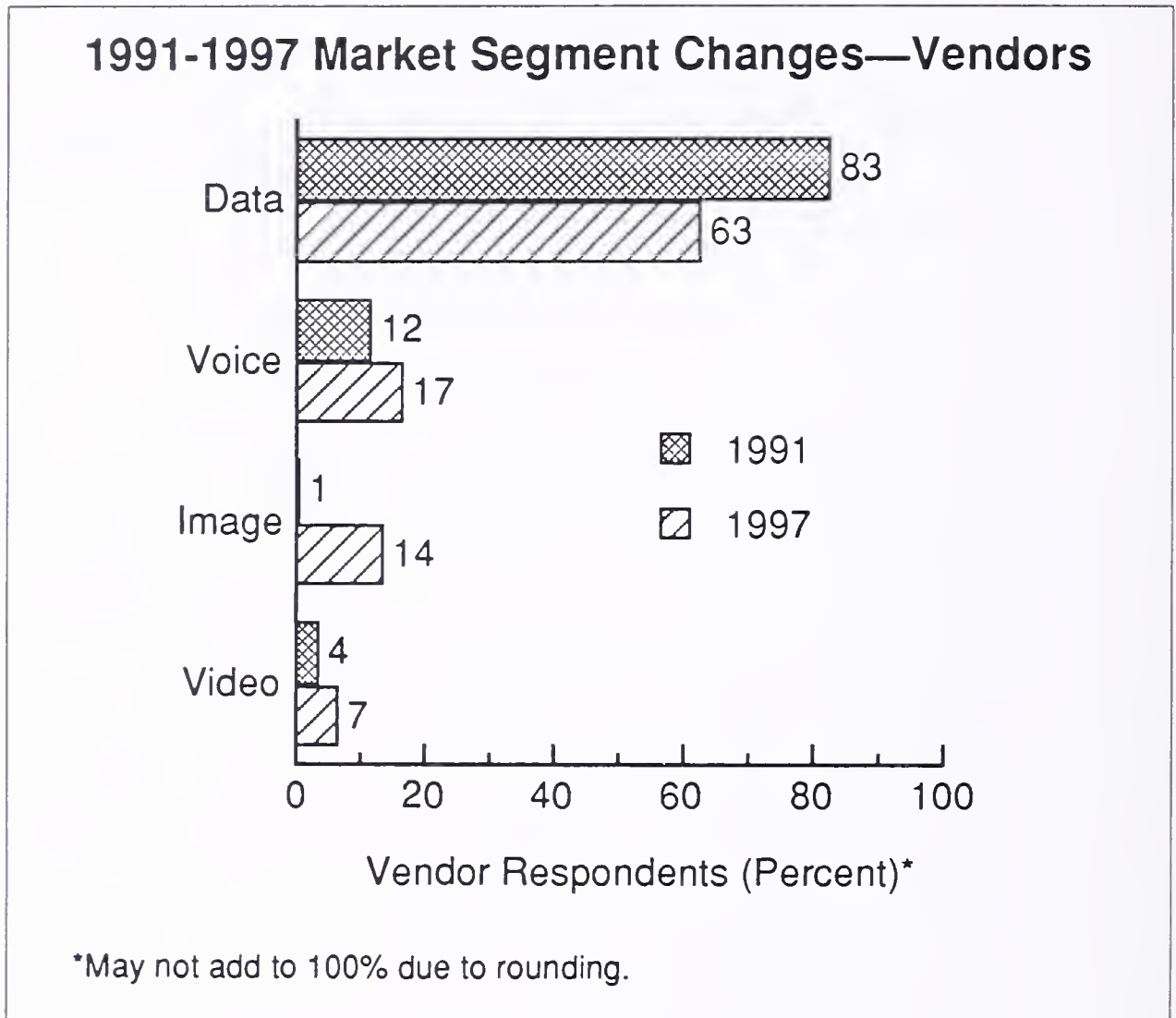
EXHIBIT III-28



2. Vendor Revenue by Market Segment

Vendors reported on current network operations management revenue and expressed their expectations for 1997. In 1991 data network services represented 83%, voice 12%, and video and image combined 5%. By 1997 vendors forecast data services will represent 63% of revenue from network operations management services, voice will increase to 17%, and video and image together will represent 21%. Exhibit III-29 illustrates the voice/data/video/image market segments from the vendor's viewpoint.

EXHIBIT III-29



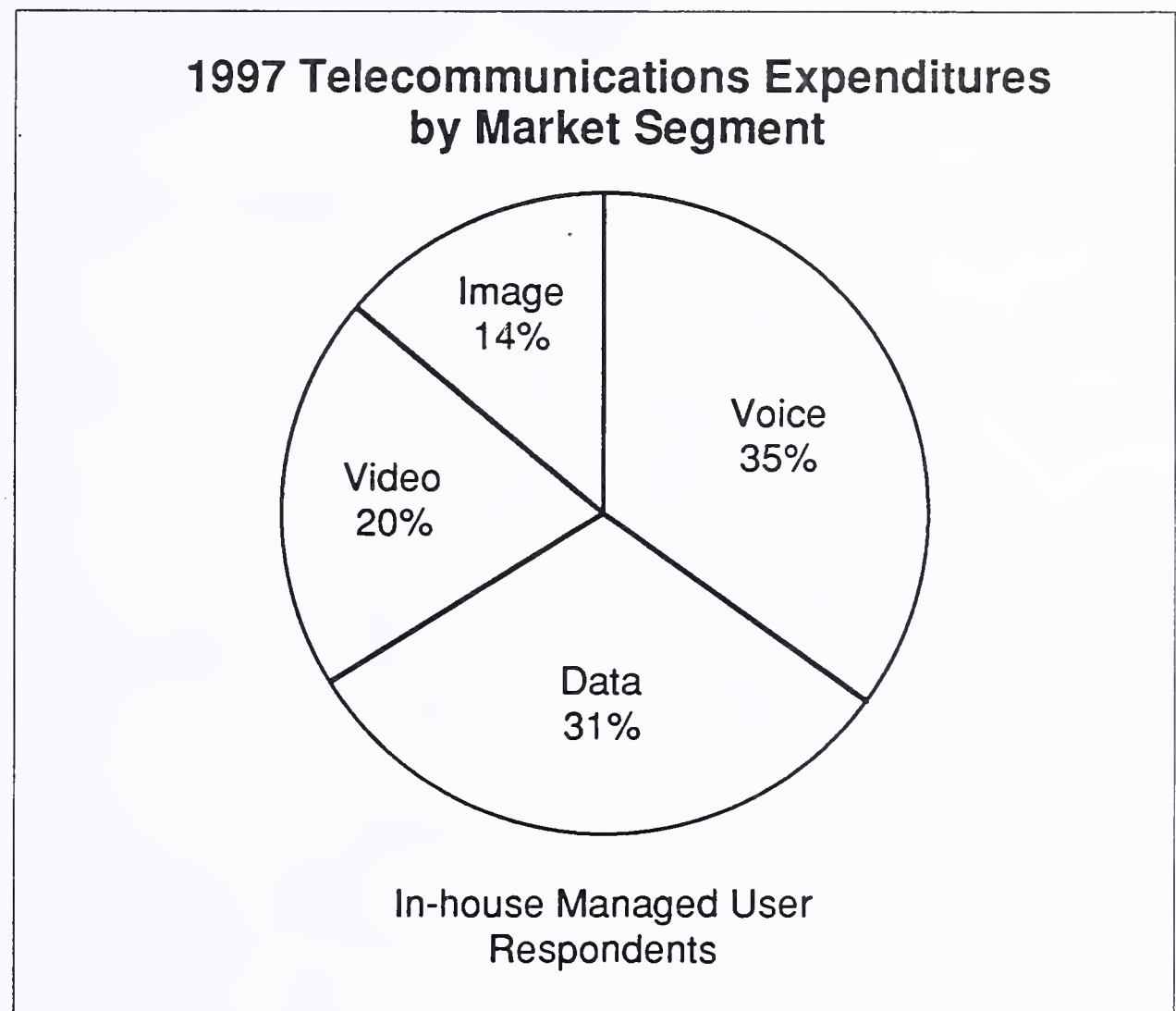
3. Analysis of User versus Vendor Perceptions for 1997

The voice segment represents the largest difference between user needs and vendor plans for future services requirements. User respondents forecast voice will represent 35% of their 1997 telecommunications expenses, down from 66% in 1991. However, vendors forecast voice will only represent 17% of their network management revenue, up from 12% in 1991. INPUT believes this represents additional voice opportunity for vendors that currently have this expertise.

The data segment represents the next largest difference between users and vendors. Users anticipate that data services will represent 31% of 1997 telecommunications expenses. However, vendors expect demand for data to represent 63% of their 1997 network management revenue.

These relative market segment forecasts of 1997 requirements are shown in Exhibit III-30 and Exhibit III-31.

EXHIBIT III-30



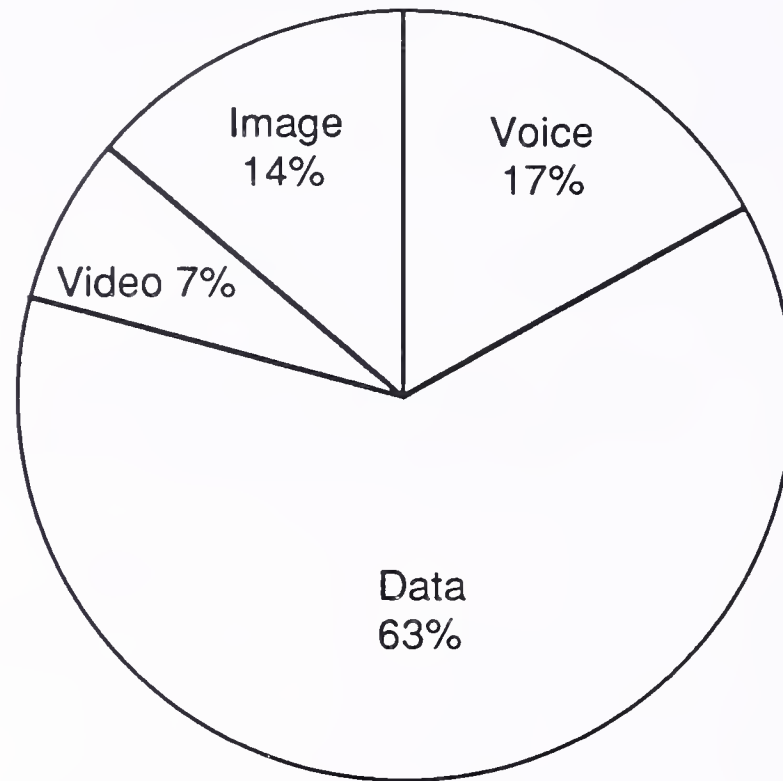
4. Market Segment Management Requirements

Vendors were asked to express their views on managing customer requirements for each market segment. Their comments are discussed below.

The voice market segment is mature, well-understood and served by current operating telephone companies. Cost considerations and responsiveness are most important. The emphasis is on configuration management (adds, moves and changes) and on-premises functions (PBX, etc.). Private networks have grown and proven cost effective in establishing virtual WANs.

The data market segment, still in a rapid growth stage, is not as well-understood as voice. The data market segment is more technology- and standards-intensive and requires high reliability and availability. LANs require end-user maintenance on client/server equipment and adequate administrative procedures to properly manage equipment. WANs require

EXHIBIT III-31

**1997 Vendor Network Operations Management
Revenue by Market Segment**

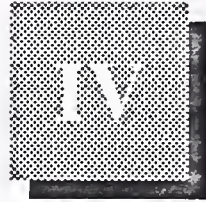
Vendor Respondents

*May not add to 100% due to rounding.

much less end-user direct participation. Emphasis is on the help desk, trouble desk and remote monitoring. Emphasis needs to be placed on control of the LAN/WAN interconnection, tools and expertise, end-to-end integrity, capacity planning, and knowledge of protocols, stable networks, and vendor equipment types. These are all functions the vendor can perform more efficiently than a user group.

The video and image market segments are very young compared to voice and data markets. They will grow very quickly to represent 21% of vendor revenue in 1997 from a 5% level in 1991. An emphasis on software expertise, wide bandwidth availability, satellite transmission capabilities, customer premise equipment support, end-to-end connectivity, and scheduling and administration of complex requirements will be necessary.

The major differences in customer requirements for these market segments are in the customers' expectations and the varying requirements of technical expertise. Voice and data represent more stable, well-developed technologies. As a result, customers have high expectations for performance and reliability. Video, image and LAN/WAN interconnectivity are less mature technologies. Customer expectations are still rising, and the technology for delivery is still growing and evolving rapidly. The challenge is understanding and managing the customers' diverse and rising service expectations.



Vendor Perspectives

In order to bring the vendor's perspective into focus, INPUT included in its research the leading network outsourcing vendors and vendors that have more recently made a decision to focus on network outsourcing. INPUT can thus present more clearly the current status and future growth prospects of network management outsourcing from the vendor's perspective.

A

Vendor Characteristics

Responses were received from 14 vendors. Although all of the vendor respondents provide network outsourcing as a strategic service, their strategies and strengths vary considerably.

The largest concentration of vendor respondents were common carriers (36%) and systems integrators (29%). Computer hardware vendors and value-added carriers each represented 14%, and network hardware vendors represented 7% of vendor respondents. Vendor experience in providing network outsourcing ranged from 2 to 20 years. The average was five years' experience.

Eighty-eight percent of the network management revenue reported by vendors was generated for service to U.S.-based firms, versus 12% from firms based outside the U.S., as shown in Exhibit IV-1.

EXHIBIT IV-1

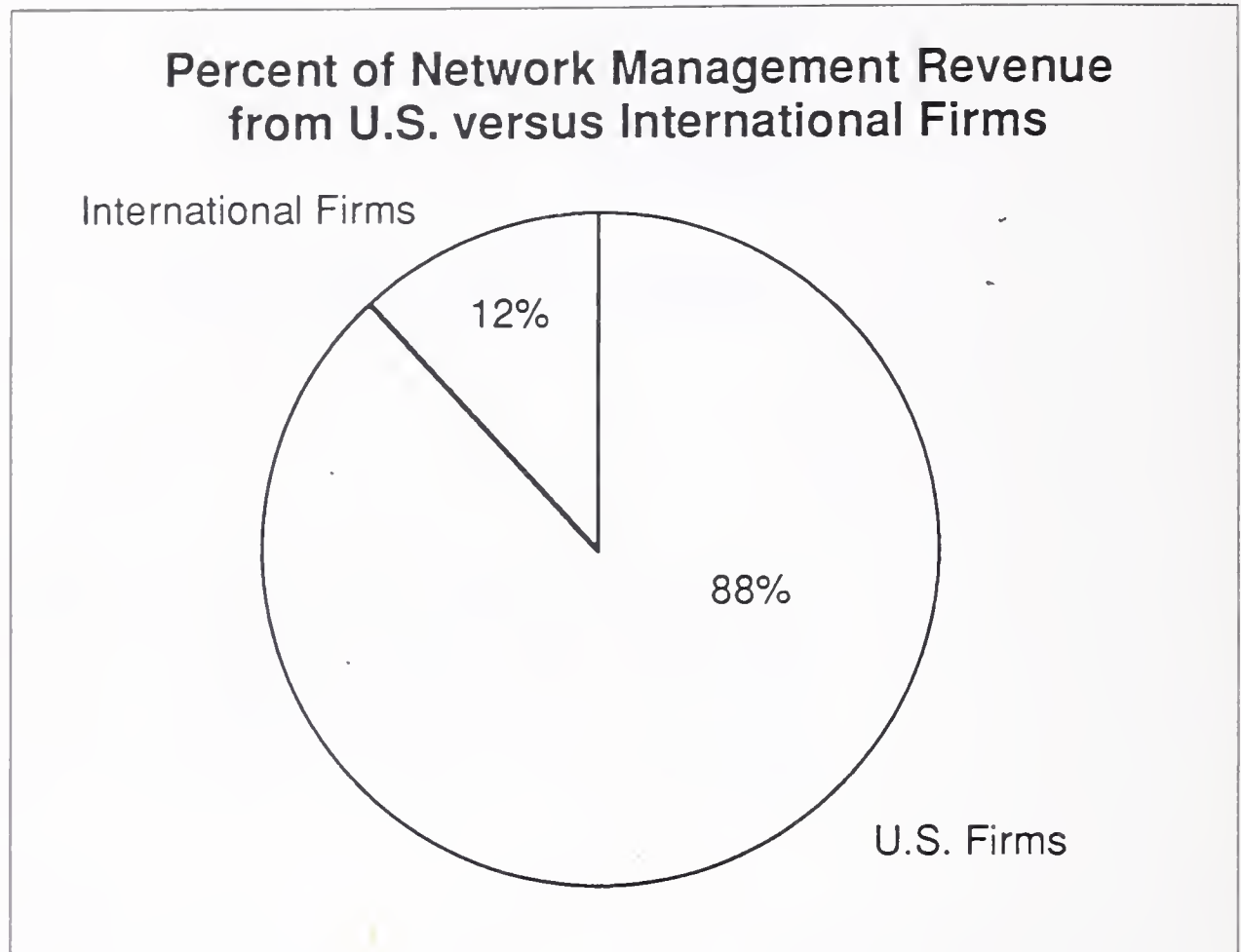
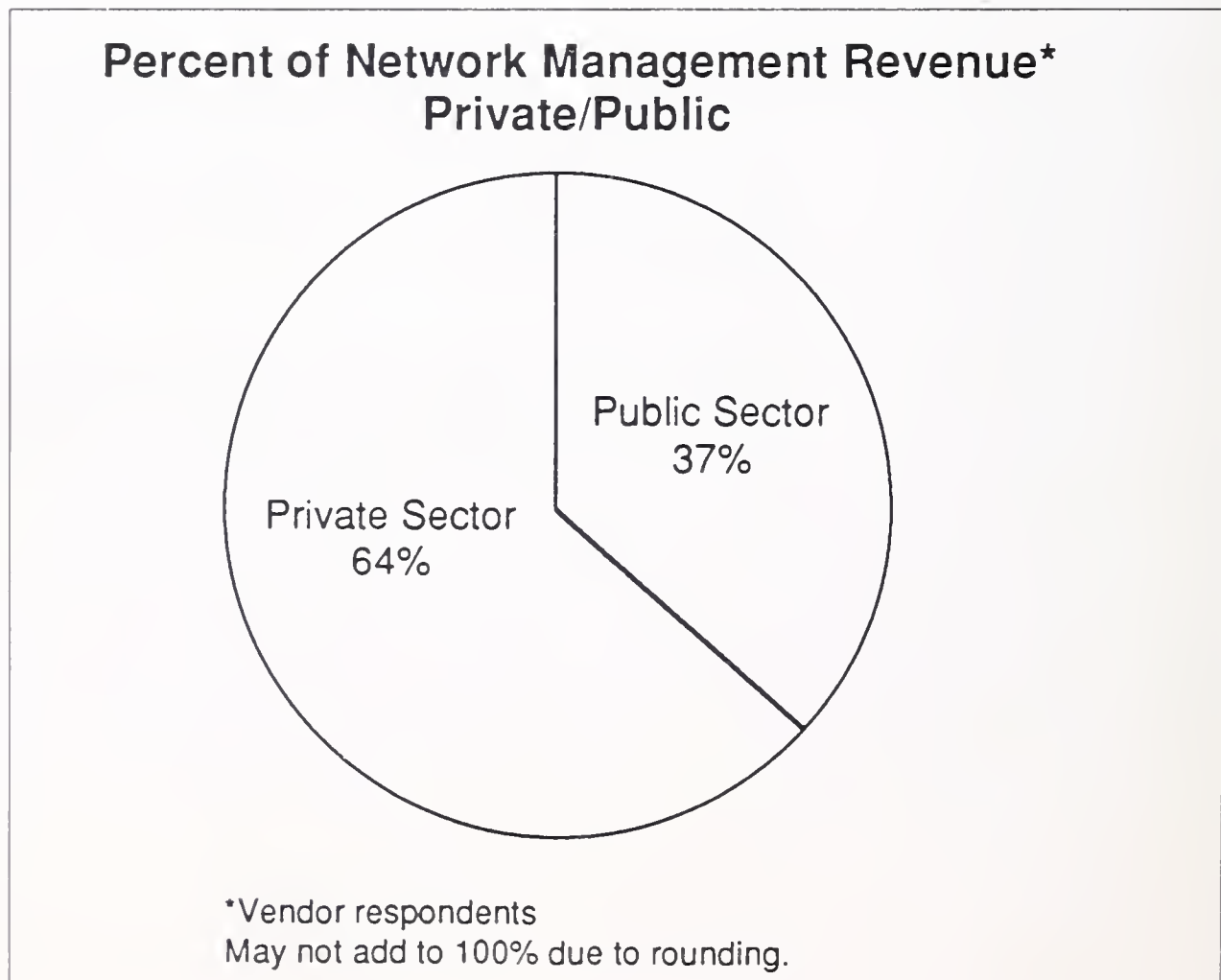


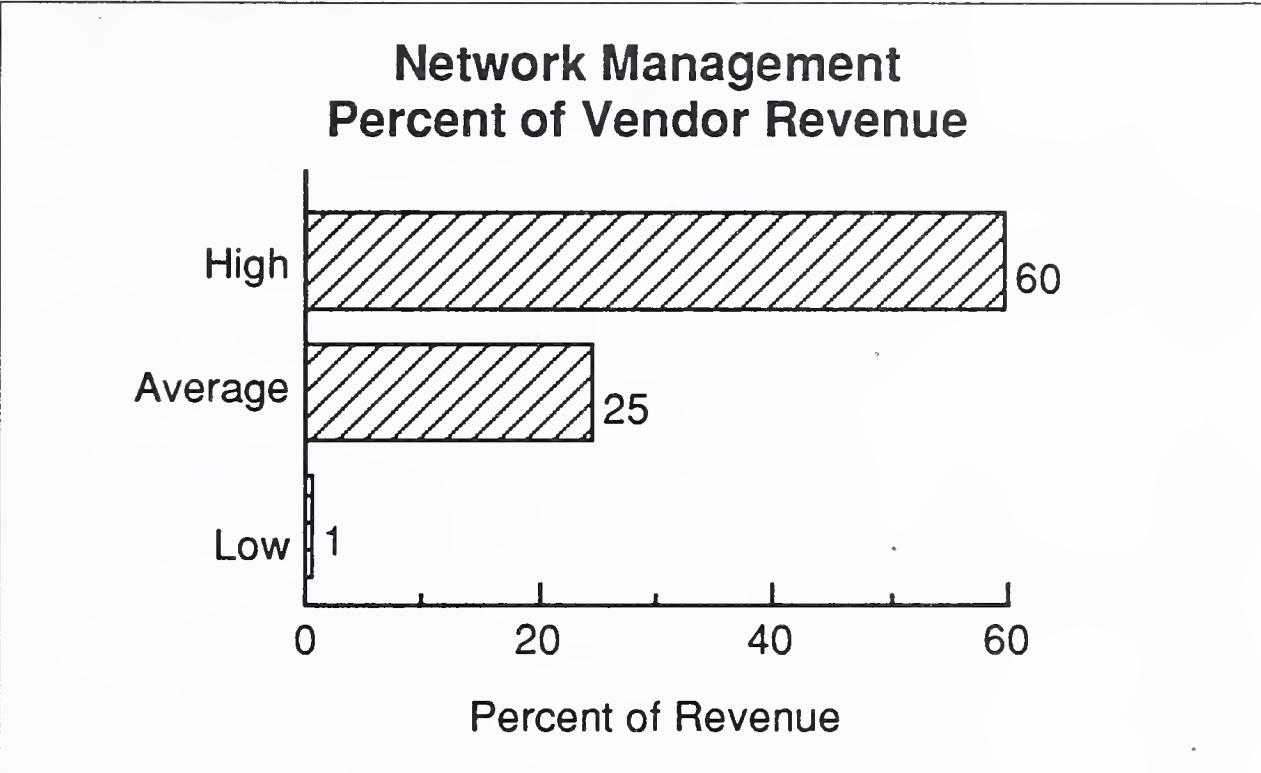
Exhibit IV-2 shows that private sector revenue represented 64% of responding vendors' revenues. Thirty-seven percent generated from the public sector, directly and through teaming relationships.

EXHIBIT IV-2



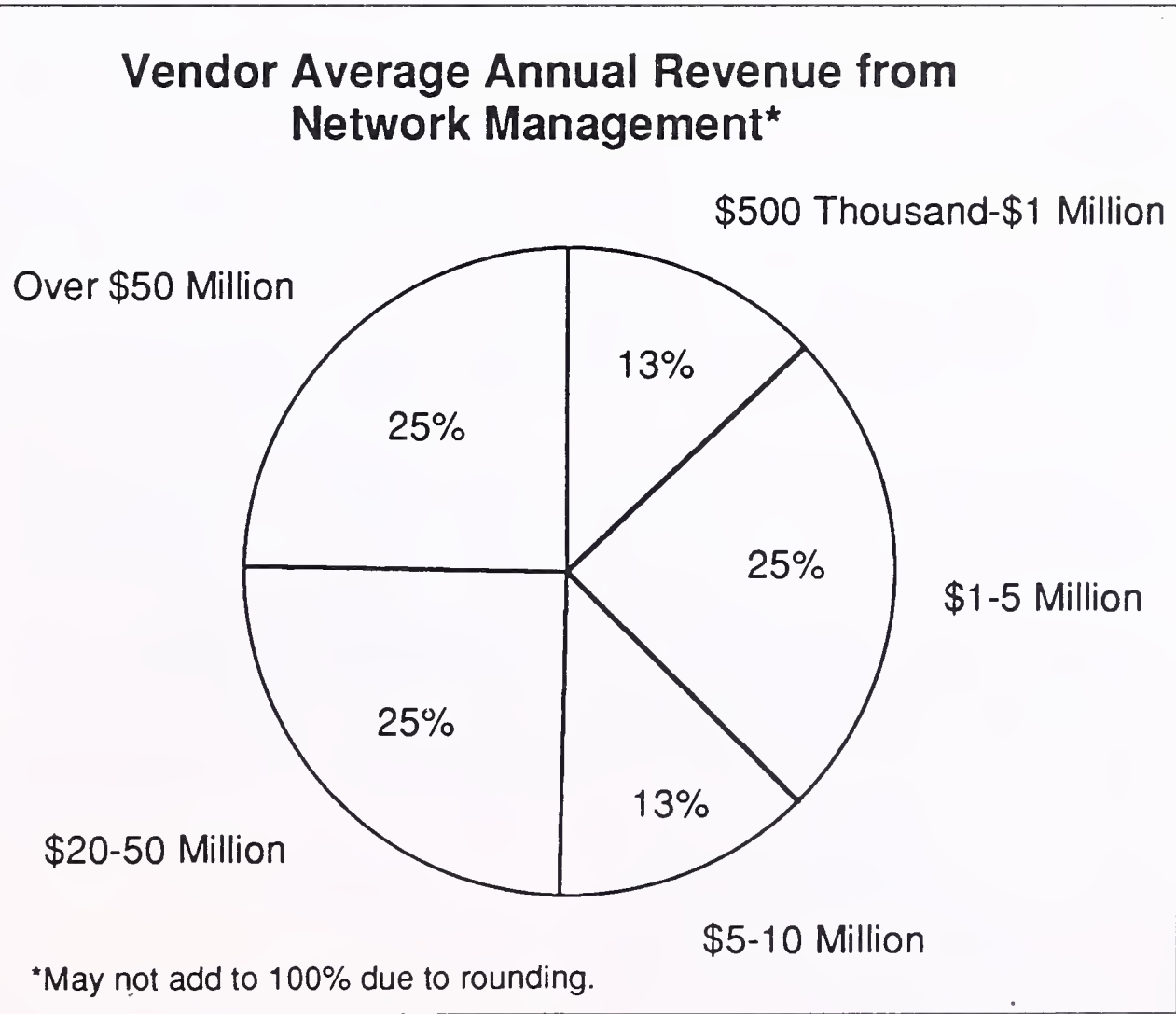
As shown in Exhibit IV-3, network management averaged 25% of vendor revenue and ranged from 1% to 60% of total vendor revenue.

EXHIBIT IV-3



Fifty percent of vendor respondents reported over \$20 million revenue per year from network management services. Twenty-five percent reported over \$50 million revenue per year, as shown in Exhibit IV-4.

EXHIBIT IV-4



Based on vendors' responses, the average network management contract size was \$1.5 million per year. The term of the contract averaged four years and ranged from three to over seven years. Network operation management contracts will vary widely based on user needs (PC-based to large centralized mainframe CPUs) and inclusion/exclusion of the voice network. Contract size and term are presented in Exhibit IV-5 and Exhibit IV-6.

EXHIBIT IV-5

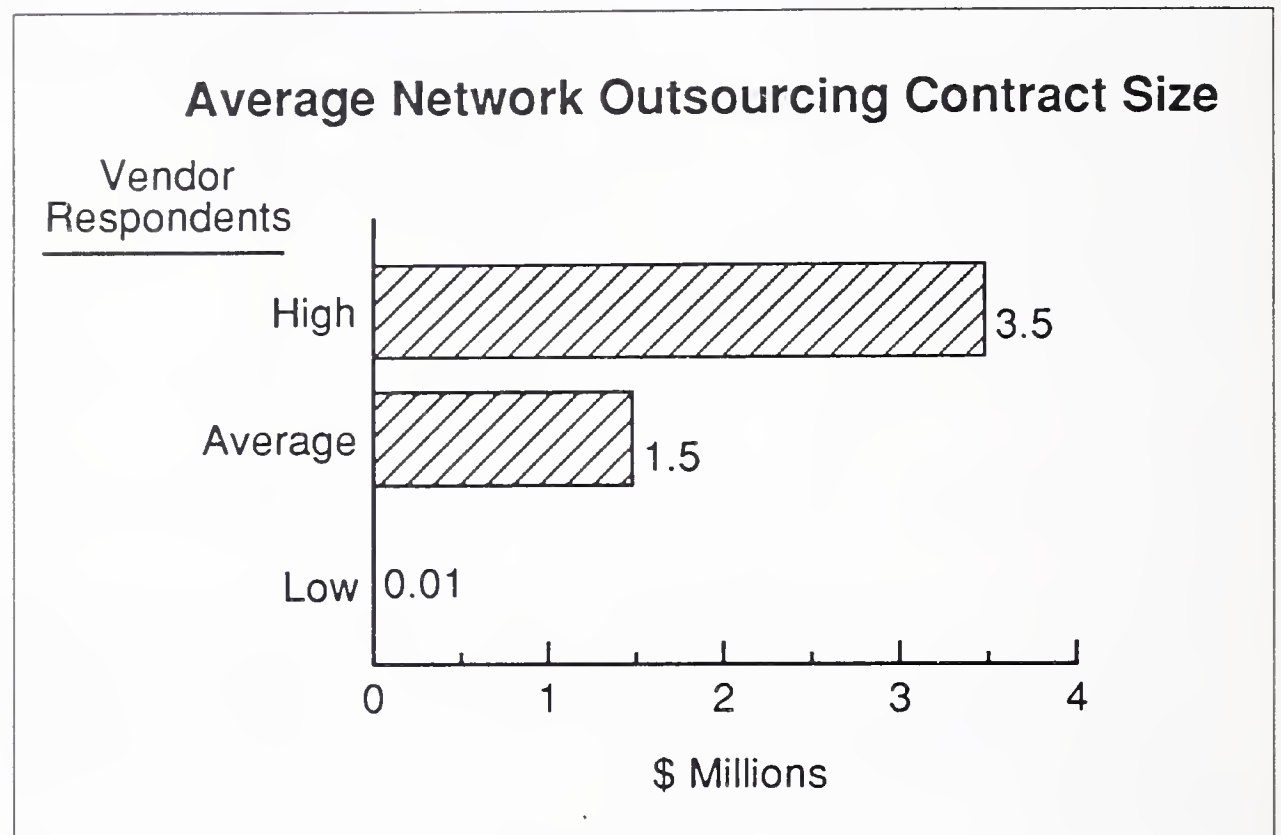
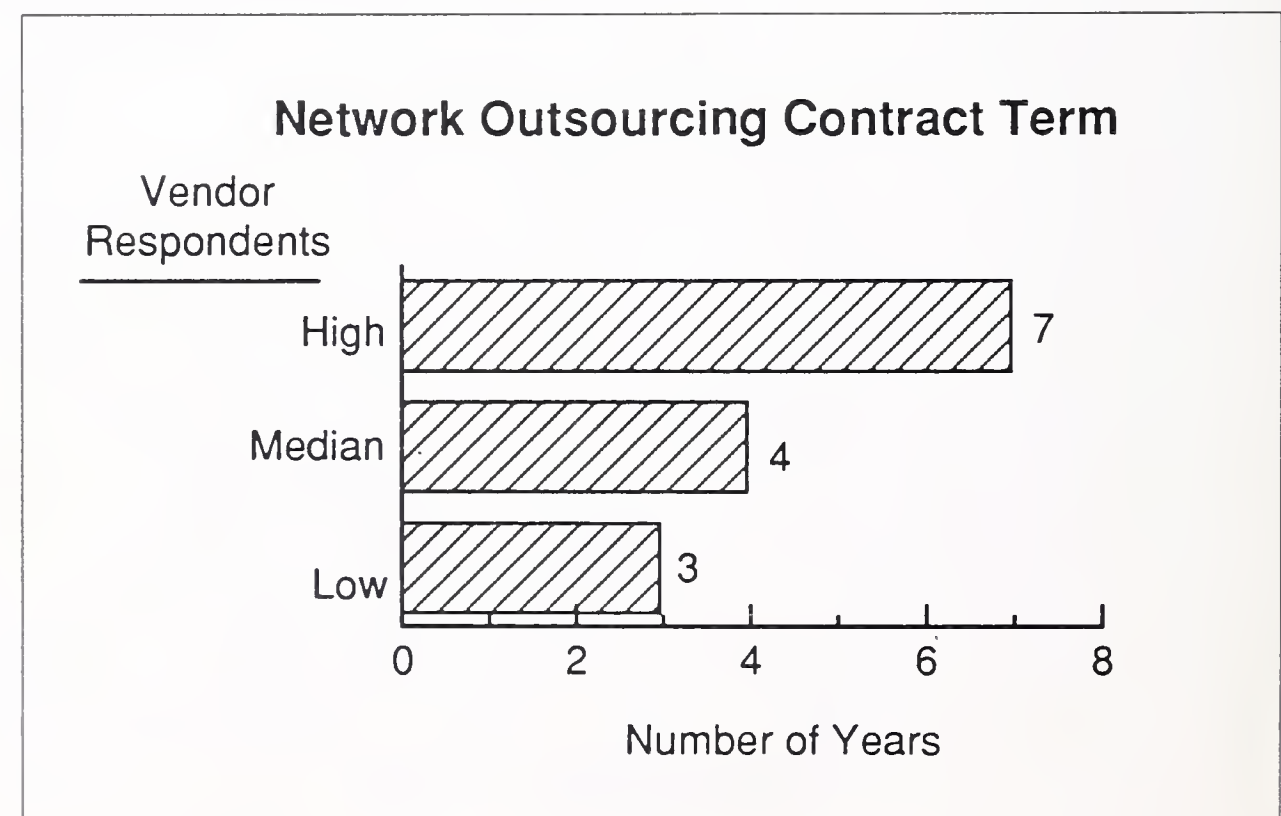


EXHIBIT IV-6



Vendors were asked to identify the unique vendor qualifications required to provide network outsourcing. The rather comprehensive list is illustrated in Exhibit IV-7.

EXHIBIT IV-7**Vendor Qualifications for Network Outsourcing**

- Voice and data network management track record
- Compatible corporate culture
- Geographic coverage
- Expertise with multiple hardware, software protocols
- Worldwide delivery and support staff
- Flexible customized solutions
- Broad business and vertical market expertise
- Financial stability
- Breadth of service
- Network availability 24 hours/7 days per week
- Independent of hardware and software vendors

The qualifications in Exhibit IV-7 corresponded reasonably well with those identified by users. However, user respondents had some additional requirements. Users identified a need for vendors with a world-class image in network operations management and that provided end-to-end control over the physical and logical network, including responsibility for all embedded equipment. In order to more closely meet user qualifications, vendors need to identify opportunities for service expansion through compatible alliances and acquisitions.

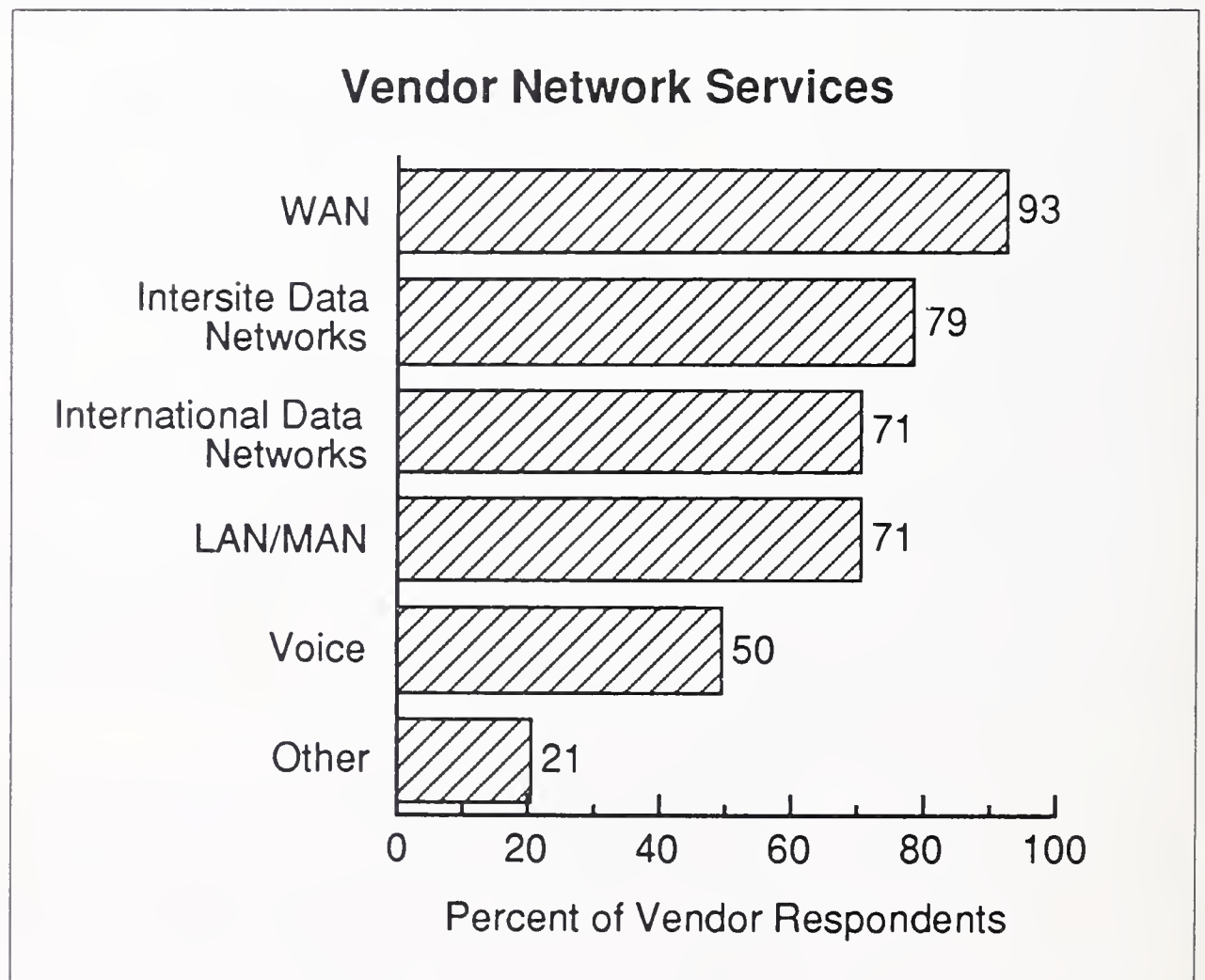
B

Vendor Services

This section covers the types of networks and services vendors provide as part of their network operations management arrangements. As appropriate, user respondent requirements are provided from Chapter III to show support from the users' perspective or a potential opportunity for vendors if there is a significant difference between the user requirements and the services available from vendors.

Exhibit IV-8 shows the network services provided by vendor respondents. Ninety-three percent of the vendor respondents provide wide-area networks and 79% provide intersite data networks. International data capabilities and LAN/MAN management were provided by 71% of the respondents. Only 50% of vendors interviewed consider themselves qualified to manage voice networks for their clients.

EXHIBIT IV-8



However, as shown in Exhibit IV-9, WANs and intersite data networks were the lowest requirements as ranked by user respondents. User respondents ranked LANs and voice networks as their highest requirement, but only 71% of vendor respondents provide LANs and 50% provide voice networks in their network operations management offering. Vendors should carefully reassess their capabilities in view of the perceived needs of the prospective clients.

EXHIBIT IV-9

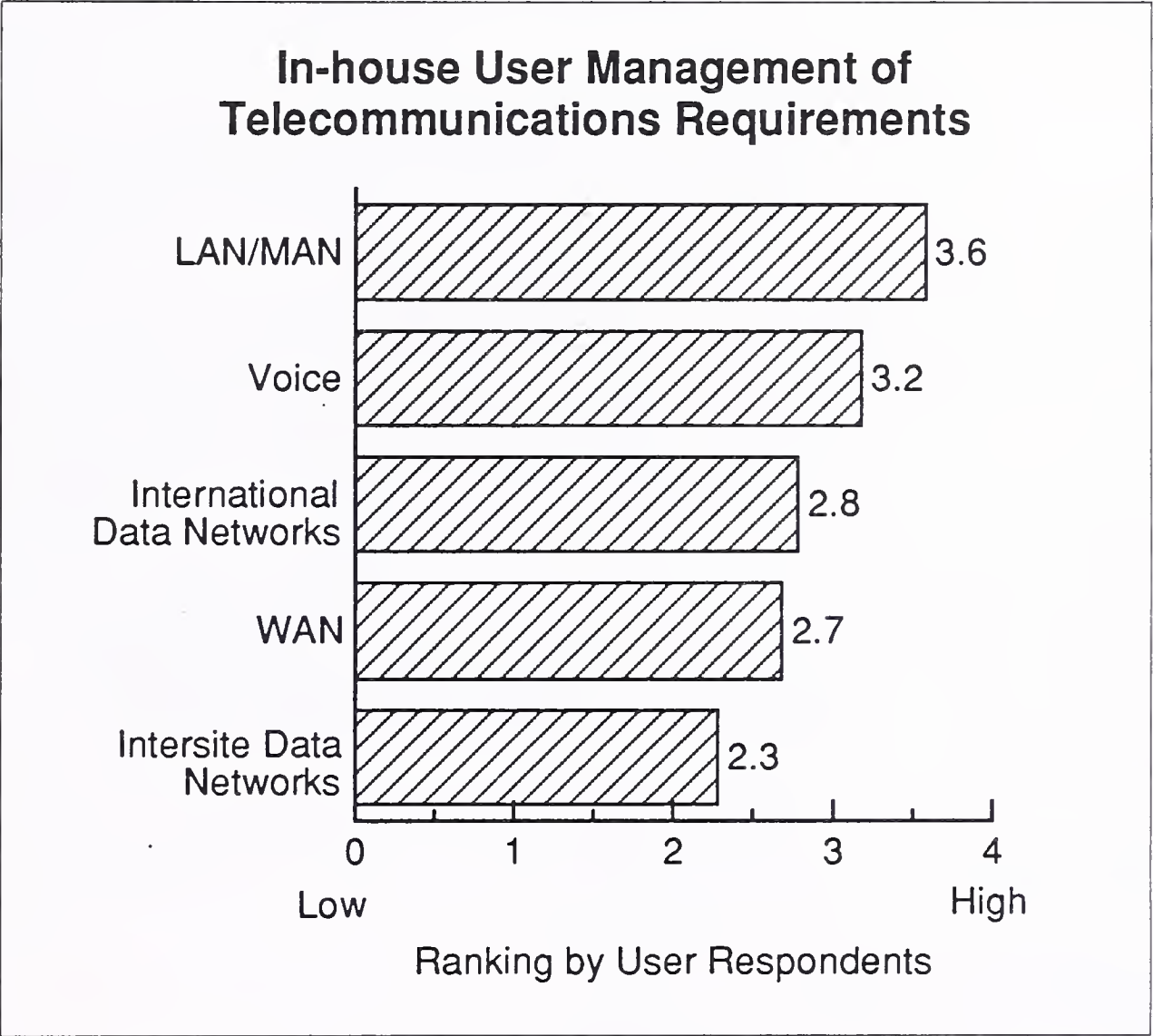


Exhibit IV-10 shows that respondents that outsource their network always included LANs/MANs in their vendor's contract. Intersite data networks and WANs were included by 86% of respondents, voice by 71% and international data networks by 43% of respondent's vendor contracts. This is another indicator of user network outsourcing requirements, and again it is at odds with the vendors' perceptions of their capabilities.

EXHIBIT IV-10

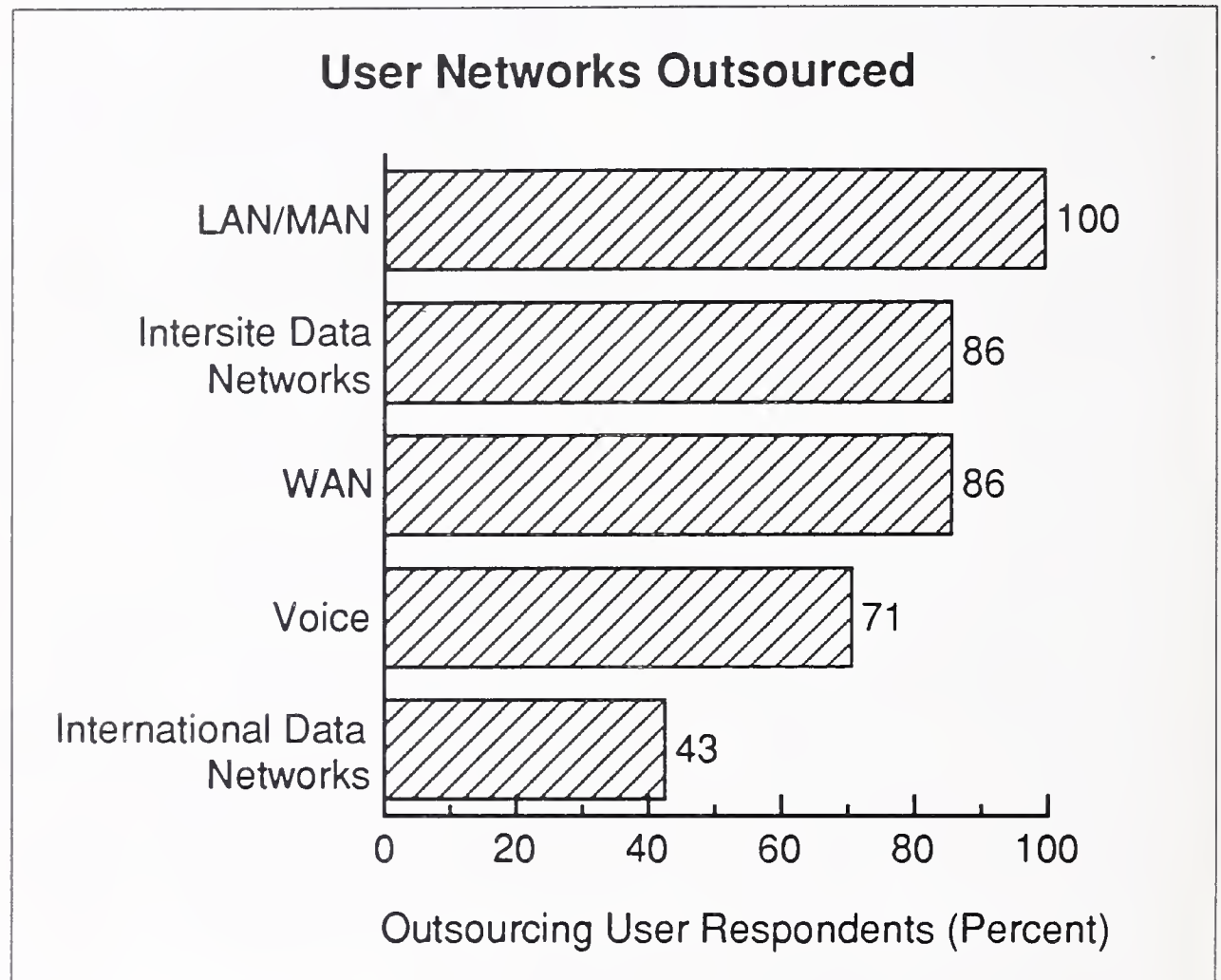


Exhibit IV-11 reflects the network operations management functions provided by vendor respondents. These functions can be viewed as functions vendor respondents currently supply to outsourcing clients.

EXHIBIT IV-11

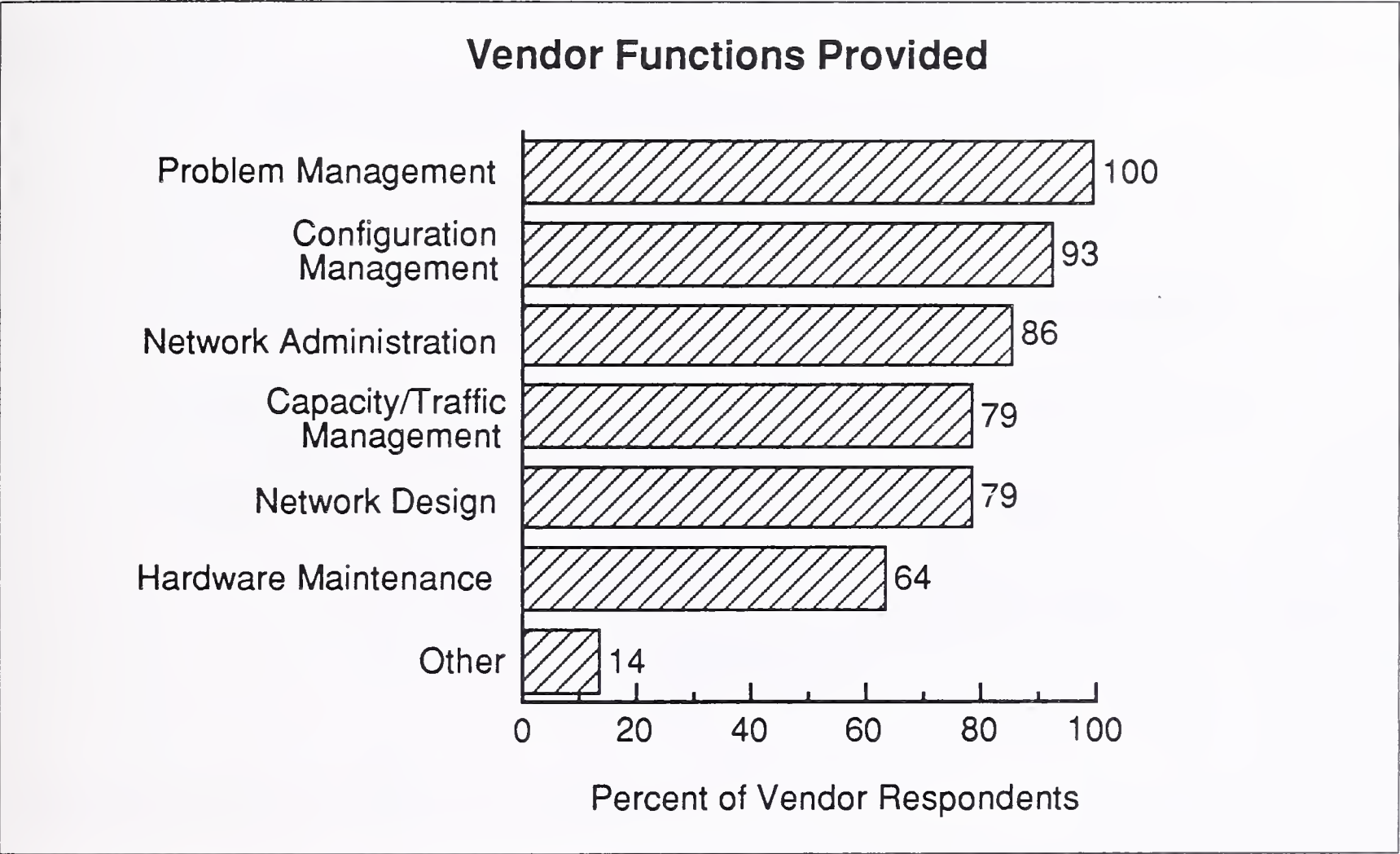
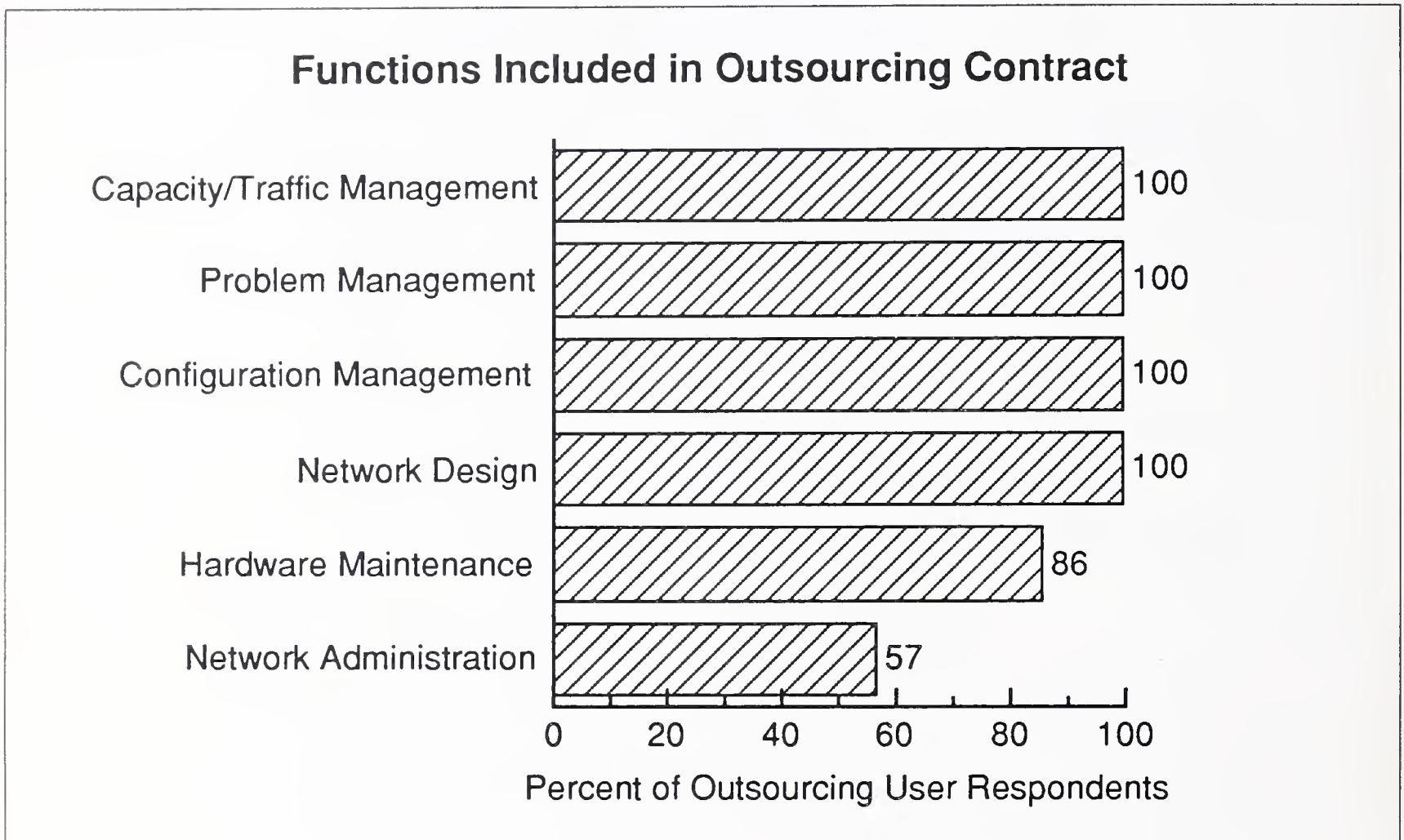


Exhibit IV-12 shows the current functions included in the user respondents' existing outsourcing contracts. These functions may be thought of as user requirements for functions that are currently being met by existing outsourcing vendors.

EXHIBIT IV-12



There appears to be greater user demand for configuration management, capacity/traffic management, network design and hardware maintenance functions than are currently provided by vendors. Just as in the case of the service type, the functional capabilities of the vendors are not necessarily matched with perceived user needs. If, for example, all outsourcing clients included capacity/traffic management and network design in their contracts, the data indicates that only 80% of the vendors really qualify as outsourcing vendors.

The distribution of vendor network operations management revenue in 1991 varied considerably based on several factors:

- Percent of voice and data business in 1991
- Whether or not vendors operated their own backbone network
- Vendor's fee structure (cost-plus, transaction-based, etc.)

With this in mind, INPUT can better interpret the revenue responses collected as part of the survey. Telecommunications vendor revenue was distributed as follows:

- 54% from network management
- 23% from circuit, toll and access charges
- 7% from hardware maintenance
- 16% from other services, which included EDI, imaging, voice and E-mail.

Sixty-four percent of vendor respondents offer systems and network operations management arrangements, while 36% percent of the vendor respondents do not provide a systems operations management arrangement.

INPUT believes that vendors that are positioned to offer both network and systems operations management arrangements have a competitive advantage in meeting the users' outsourcing requirements. This advantage takes the form of marketing and technical leverage that may be shared and interrelated between both arrangements. Some vendors are planning for an integration of network and systems operation management arrangements over the next five years.

C

Vendor Strategies and Teaming Patterns

Vendors providing network operations management represent a wide range of traditional services providers. Since users require expertise in multiple technologies (data, voice, video, image, communications, computing, hardware, software, etc.) as well as service and support in many geographic locations, highly creative alliances and teaming arrangements are common in this industry.

Exhibit IV-13 highlights vendor perceptions of leading network outsourcing vendor strategies and unique strengths. IBM and AT&T were mentioned most frequently by vendor respondents.

EXHIBIT IV-13

Leading Network Outsourcing Vendors (Vendors' Viewpoint)

Vendor	# Mentions	Strengths	Strategy
IBM	6	Financial, software & hardware dev. Data center, processors Platform Established customer base Embedded system provider	Increase mkt. penetration Bundle network & data center together, SNA
AT&T	6	Networking, circuits, network mgmt., image, presence, U.S. market share Ubiquitous, network technology leadership Telephony	Increase mkt. penetration Build own network, tools One-stop global network provider, tariff 12
EDS	3	Leading service provider Vendor independent, size Number of customers	Facility management Focus on computer center & applications
DEC	2	Distributed system software & hardware development NMS	Increase mkt. penetration NAS
BT	2	Worldwide image Global presence	Global service through Syncordia
MCI	1	Innovative	LAN interconnection
NET	1	Positioning to be SNMP	
Racal Datacom	1	Multivendor support	
Synoptics	1	Positioning to be SNMP	
Sprint	1	Initiative, knowledge, experience	

Vendors describe their strategies and unique market positioning in Exhibit IV-14. Vendors use their technology depth or breadth of service and support, and vertical market solutions expertise to differentiate themselves. Vendors providing both network and systems outsourcing arrangements stressed total outsourcing solutions. INPUT believes continued expansion through acquisition is likely and that more value-added services are likely to provide attractive opportunities for vendors.

EXHIBIT IV-14

Vendor Strategies

- Operations management experience, value-added services in principal vertical markets
- Integration of solutions with service focus
- Breadth of service...“we design, build and operate the network”
- End-to-end support
- Leverage SNA strengths
- Incorporate new technologies to match emerging trends
- Single-source provider of worldwide network management
- Global network control center and global network support infrastructure
- Independent of any single hardware vendor or long distance carrier
- Full-range outsourcing provider (systems to network management)
- Augment customer’s internal capability and provide remote management
- Value-added service connecting multiple vendors within a single industry
- Technical depth across entire range of networking solutions, collaborative work culture and strategic partnering

Most vendors indicated they need long-term strategic alliances to lower the delivery costs and enhance the ability to deliver a solution to the client. However, only 29% of vendor respondents currently have such an alliance. Seventy-one percent of vendor respondents have not yet entered a strategic alliance for network outsourcing management.

The wide range of vendor respondent strategic views regarding alliances is provided in Exhibit IV-15. INPUT believes that the trend toward alliances will increase as vendors become successful in managing these complex relationships. As discussed in Chapter III, user respondents believe that teaming relationships will be necessary for vendors to keep up with the increased pace of technological changes in the telecommunications arena.

EXHIBIT IV-15

Vendor Network Outsourcing Alliance Strategy (Vendor Respondents)

- Alliances provide multiple sources for commodity products.
- Alliances help to deal with rapid technical change.
- Both parties must benefit from strategic alliances.
- Hardware manufacturers need alliances to provide full service support as part of a product sale.
- Geographic service restrictions create opportunity for various short-term tactical relationships.

One vendor respondent summed it as follows:

“Our networking alliances seem to be working well, particularly at the local level. They are necessary for a vendor to meet the customers’ wide-ranging network management needs. Alliances are here to stay, and the vendors that manage them wisely will be successful.”

Exhibit IV-16 highlights the expected changes in the network operations management arrangement over the next five years.

EXHIBIT IV-16

**Changes in Network
Operations Management, 1992-1997**
(Vendor Respondents)

- Shift to packet switch networks
- Replacement of shared networks by private networks
- Control of virtual network through user workstations
- Market domination by carriers and large vendors
- Integration of systems and network operations management

Respondents are forecasting a shift to packet switch networks as the volume of network traffic increases and data, image and video transmissions increase their share of the currently voice-dominated network. Corporate users of the public network between remote sites for high-speed data service (frame relay and switched multimegabit data services) will increase substantially at the expense of private networks.

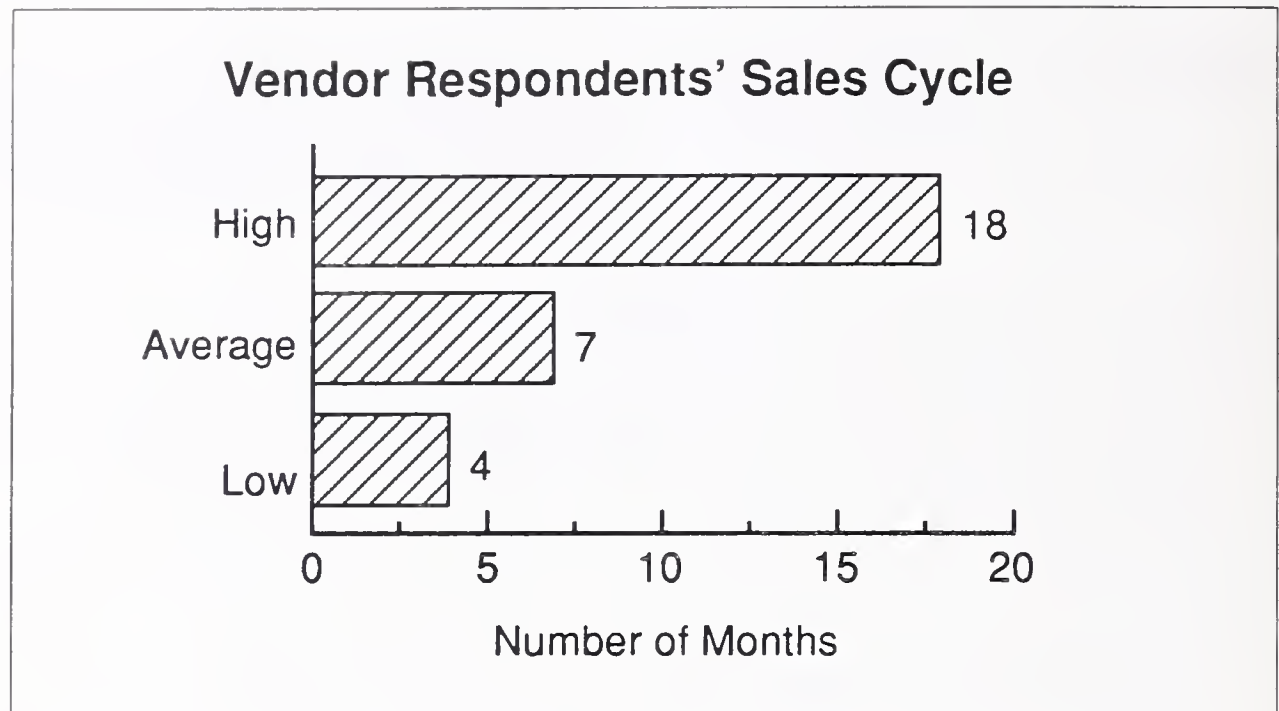
These changes will increase the complexity of network management issues such as session management for voice, data, video and image sessions and the tighter management and integration of public/private hybrid networks.

The set up and control of a virtual network will move from carriers to users. Users will be able to control virtual networks from their workstations. This control will be paced by the operating companies' capability to schedule dynamic virtual circuits, collect usage information and bill appropriately.

Respondents believe that the outsourcing market for network and systems management arrangements will be consolidated. The combined outsourcing market will be dominated by very large vendors, and the telephone companies will play an increasingly competitive role.

Vendors' sales cycles for network operations management range from four to eighteen months. The average user takes seven months to make this decision, as shown in Exhibit IV-17.

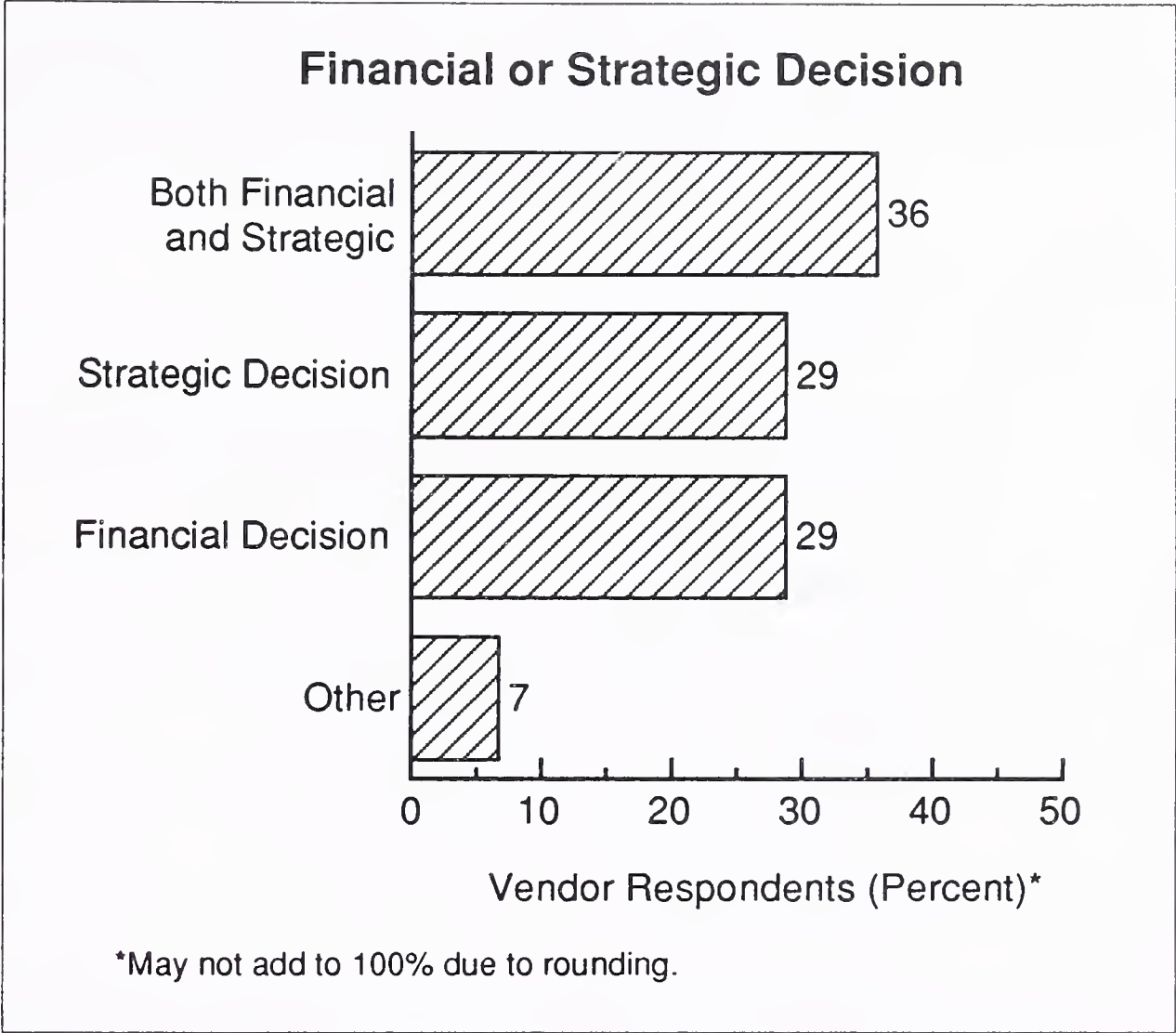
EXHIBIT IV-17

**D****Customer Benefits/Satisfaction**

Vendor respondents discussed the primary benefits that users expected as a result of network outsourcing. This section presents user benefits, needs and customer satisfaction from the vendor perspective. User views on these issues—discussed in Chapter III—are included, when appropriate, for comparative purposes.

As shown in Exhibit IV-18, 36% of vendor respondents believed the users' decision to outsource their network was based on a combination of financial and strategic requirements. Twenty-nine percent of vendors believed the decision to be financial, and another 29% believed it was a strategic decision.

EXHIBIT IV-18



Ninety-four percent of user respondents believed the decision to be financially based, and 41% also felt the decision to outsource their network had strategic benefits, as discussed in Chapter III. Vendors supported these positions with their beliefs. Exhibit IV-19 separates reasons by financial, strategic and both.

EXHIBIT IV-19

Support for Financial versus Strategic Decision (Vendor Respondents)

Financial Decision

- Network and systems management enable vendors to optimize cost savings
- Companies expect to reduce cost by 20%

Strategic Decision

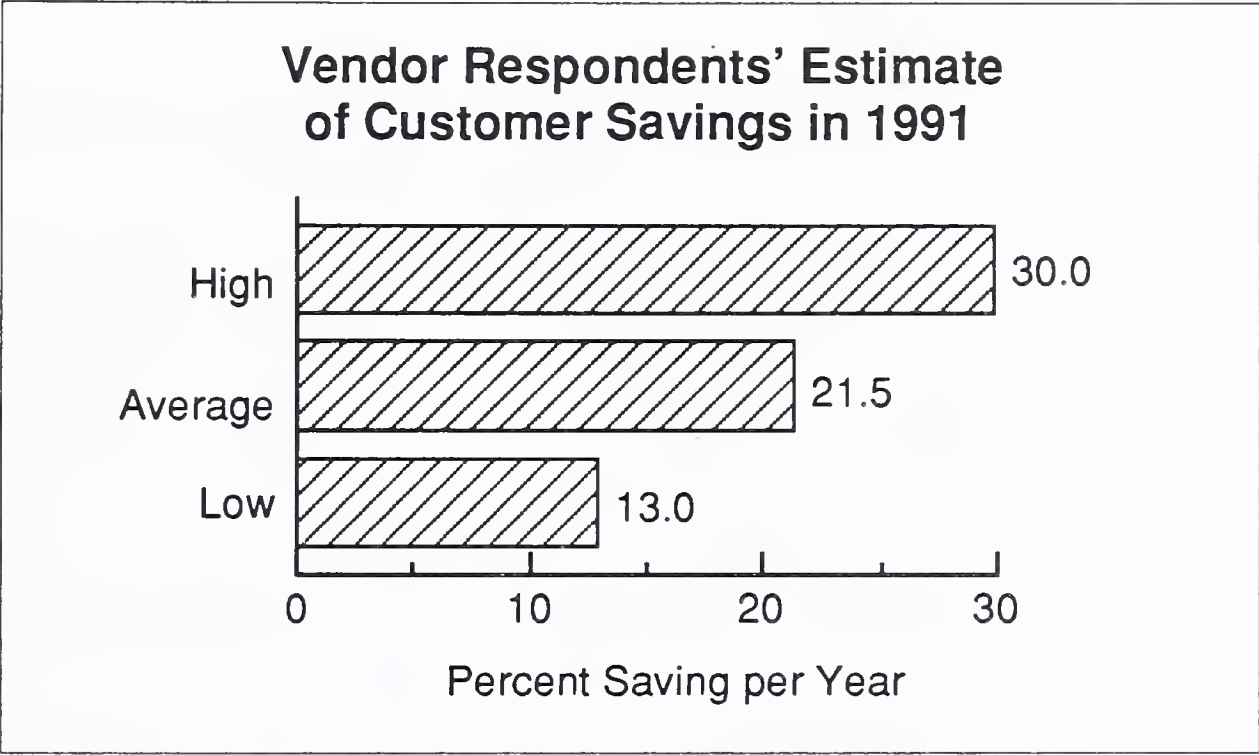
- Direct investments into core business and outsource other functions
- Partner with a networking technology leader to increase competitiveness

Both Financial and Strategic Decision

- Increases control over network availability, reliability and expenses
- "In most cases, network outsourcing can kill two birds with one stone. It can save the company money and allow the company to focus its resources on its core business."

Vendor respondent estimates of customer savings in 1991 from network outsourcing ranged from 13% to 30%. Exhibit IV-20 shows the average saving was 21.5%. This saving is highly consistent with users' experience shown in Chapter III, with an average saving of 21% realized in 1991.

EXHIBIT IV-20



Vendor respondents summarize the benefits realized and those yet to be realized from network operations management arrangements in Exhibit IV-21. Both financial and strategic benefits have been realized by companies that have made the decision to outsource their network.

As mentioned in Chapter III, user respondents that currently outsource their network reported that most of the benefits they anticipated either have been realized or are in the process of being met.

EXHIBIT IV-21

Network Operations Management Benefits
(Vendor Respondents)

Benefits Realized	Benefits Yet to Be Realized
Performance improvements	Multivendor management
Focus on principle business	More strategic asset use
Increased service levels	Integration of services
Cost savings	Total interoperability
Expense control	Use of enhanced services
Head count reduction	No need to hire personnel with specialized skills
Network design can transition to new technologies	Full cost savings
Higher availability	New applications
Single-source accountability	
Economies of scale	

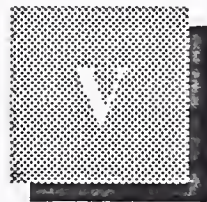
Most of the vendor respondents (69%) measure network operations management customer satisfaction. These vendors believe their network operations management customers are either satisfied or highly satisfied. User experience, as discussed in Chapter III, supports vendor estimates of customer satisfaction with network operations management. Forty-three percent were highly satisfied and fifty-seven percent were satisfied, as shown in Exhibit IV-22.

EXHIBIT IV-22



E**Conclusion**

User satisfaction, proven cost savings and increased networking service levels suggest that vendors are well prepared to deliver on their network operations management promises. The current economic and competitive environment will help accelerate the trend toward outsourcing corporate networks.



Market Trends and Forecasts

A

Market Trends and Changes

User and vendor perspectives on network operations management changes and trends over the 1992-1997 time frame are presented in this section.

The survey participants reported that network outsourcing is impacted by regulatory, marketing, economic and technology trends. However, the trends more specific to the network outsourcing arrangement are highlighted in Exhibit V-1 and discussed below.

EXHIBIT V-1

Trends Impacting Network Operations Management

- Open system standards
- Integration of communications and computing
- Client/server LANs
- Increased pace of new technology
- Value-added services

Vendor commitment to open system standards is fundamental to the growth of network outsourcing and achievement of the vision for information technology. Through the implementation of these standards across all levels (transport through application), outsourcing vendors will interconnect technologies from multiple vendors such that data will have the same flexibility of movement, control and presence as voice has today.

ACD (automatic call distribution) is a good example of the user advantages gained from the integration of computing and communications. By combining advanced incoming call handling with sophisticated management information systems, ACDs are helping call centers increase revenue and control expenses.

The pace of new communications hardware and software technology will continue to increase. Advancements will be made in wireless networks, customer premise equipment, smaller and lower cost network platforms, high-speed protocols and packet switching technology. Integrated network management platforms based on the open system interconnect model will help automate network management. Enhanced public network offerings based on the new technology—such as FDDI, T3, SONET, frame relay, switched multimegabit data services (SMDS), B-ISDN and virtual networks—will keep demand for public network services growing.

Value-added services—such as POS, EDI, video conferences, voice/E-mail, ACD, etc.—will increase network traffic and accelerate demand for network management outsourcing arrangements.

The above trends will result in major marketplace changes. Exhibit V-2 highlights the changes to the network operations management arrangement over the next five years.

Respondents are projecting a shift to packet switch networks as the volume of network traffic increases and data, image and video transmissions increase their share of the current voice-dominated network. Corporate users of the public network, between remote sites, for high-speed data service (frame relay and switched multimegabit data services) will increase substantially at the expense of private networks.

These changes will increase the complexity of network management issues—such as session management for voice, data, video and image sessions—and the tighter management and integration of public/private hybrid networks.

The set up and control of a virtual network will move from carriers to users. Users will be able to control virtual networks from their workstations. This control will be paced by the operating companies' capability to schedule dynamic virtual circuits, collect usage information and bill appropriately.

EXHIBIT V-2

**Changes in Network
Operations Management, 1992-1997**
(Vendor Respondents)

- Shift to packet switch networks
- Replacement of shared networks by private networks
- Control of virtual network through user workstations
- Market domination by carriers and large vendors
- Integration of systems and network operations management

Respondents believe that the outsourcing market for network and systems management arrangements will be consolidated. The combined outsourcing market will be dominated by very large vendors, and the telephone companies will play an increasingly competitive role.

B**User Issues**

The above network management trends have raised several high-priority user issues that serve to increase the demand for network outsourcing. These issues are summarized in Exhibit V-3 and discussed below.

- Users are highly motivated to focus their precious management and financial resources on their core business and contract other services to the experts. Network management is a prime candidate for one of the services that should be turned over to a capable vendor.
- The complexity of the telecommunications network and associated management tools is increasing as new technology and services become available and disseminated. This complexity results in increased expense in staff training, network management software and hardware. Multivendor management problems still persist.

EXHIBIT V-3

User Issues

- Increase focus on core business
- Reduce complexity of network and network management tools
- Reduce telecommunications expenditures
- Increase staff quality and reduce staff turnover
- Increase network availability and reliability
- Increase interconnectivity between LANs and WANs

- Telecommunications expense reduction and cost containment are major user issues that have been difficult to implement by the user.
- Users lack the skilled personnel to manage their integrated voice and data network requirements. Attracting a high-quality network staff, minimizing staff turnover and career planning are key user issues that vendors are better positioned to meet.
- Outsourcing vendors can achieve increased levels of network reliability and availability 7 days a week, 24 hours a day across the user's enterprise. Vendors accomplish this by practicing professional network management and using advanced networking protocols and standards that enable interoperation between multiple vendors' equipment.
- The popularity of client/server local-area networks and WANs has increased the demand for interconnecting LANs with wide-area networks for the benefit of users and cross-departmental information sharing in the enterprise.

C**User Concerns**

Before users are ready to accept an outsourcing arrangement for their network, vendors and users need to reconcile several user concerns that are highlighted in Exhibit V-4 and discussed below.

EXHIBIT V-4

User Concerns

- Loss of control
- Network a strategic corporate asset
- Skills to manage and control vendor
- Vendor motivation
- Vendor treatment of personnel
- Vendor credibility
- Single versus multiple vendors

- Users need to be satisfied that they can work with the vendor to put in place a management and control system that will overcome their concern with loss of control.
- Many users consider their network a strategic corporate asset. These situations will bring out emotional and business beliefs of user management. The user may go through a decision process that determines those aspects of the network can be outsourced without compromising corporate strategy.
- Users may need help in identifying and developing the skills and management process required to successfully manage and control the vendor to meet the goals of the users' company.
- Some users may be concerned that the vendor's motivation and the user's networking goals are jointly shared. Vendors must articulate the tradeoffs they make in network expansion and the user's goal of expense reduction.
- Users are concerned with the vendor's reputation for maintaining staff quality and the treatment their personnel will receive when transferred to the outsourcing vendor's control.
- Vendor credibility and expertise in voice as well as data have made progress, but there is still room for improvement. Vendors are likely to be most credible in either voice or data rather than in both voice and data.

- Users want to work with a vendor that has a proven reputation for world-class network outsourcing service from a technical, management and marketing perspective. Most user respondents show a desire for a single vendor for both systems and network outsourcing arrangements. Others have selected the best vendor in each arena (networking, data center, desktop computing and applications development).

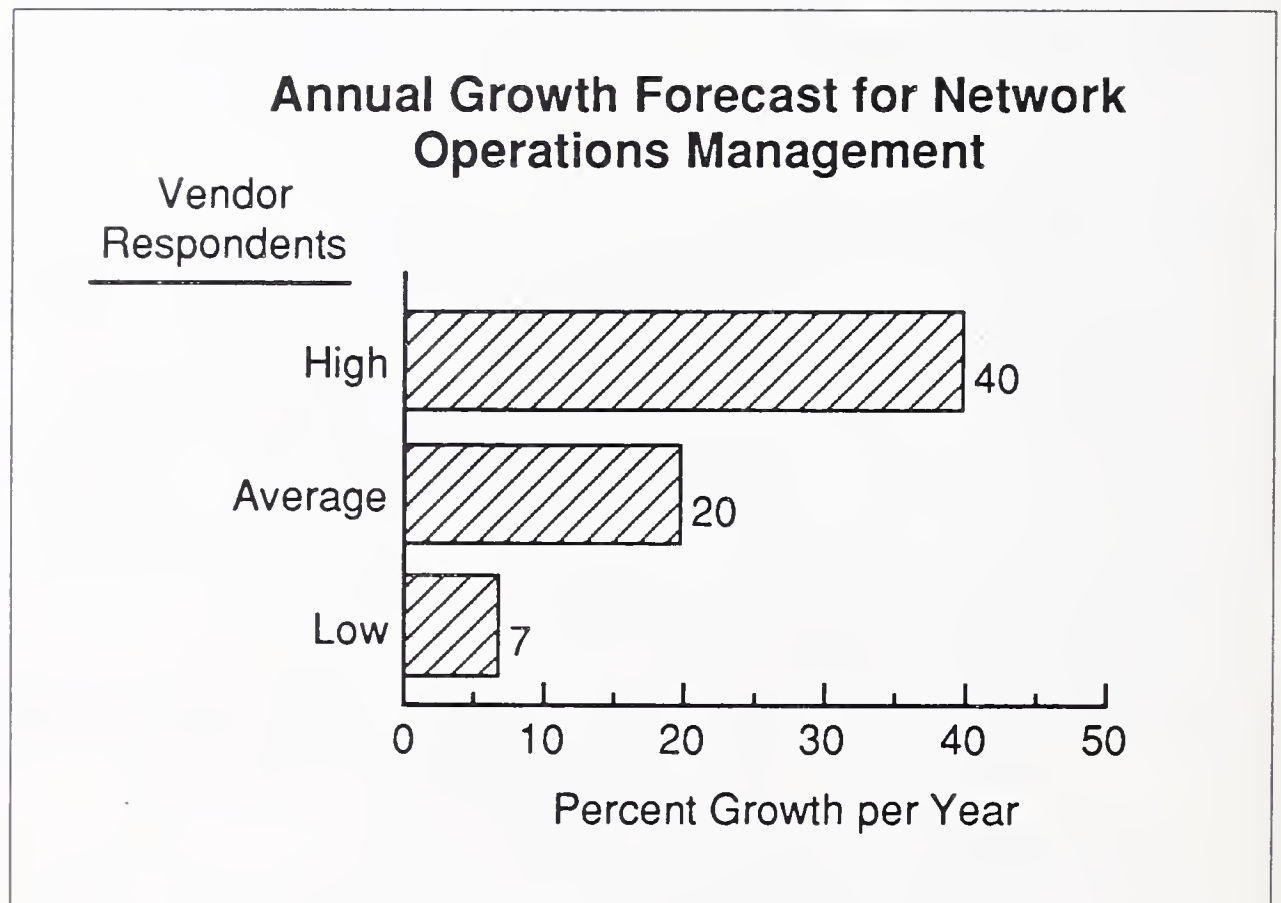
D

Market Growth

All vendor respondents (100%) agreed with the overwhelming majority of user respondents (93%) that network outsourcing is a growing trend.

Over the next five years, vendors forecast annual growth rates ranging from 7% to 40%. The average annual growth forecast through 1997 was 20%, as shown in Exhibit V-5.

EXHIBIT V-5



E

Market Size and Forecast

Network management outsourcing is not a new concept, but the demand for such services is increasing as organizations get more complex, increase their global reach and distribute the processing power to the users.

In addition, a competitive marketplace, two years of recession, and the explosion of information technology options have set the stage for accelerated growth for network operations management outsourcing in the 1992-1997 time period.

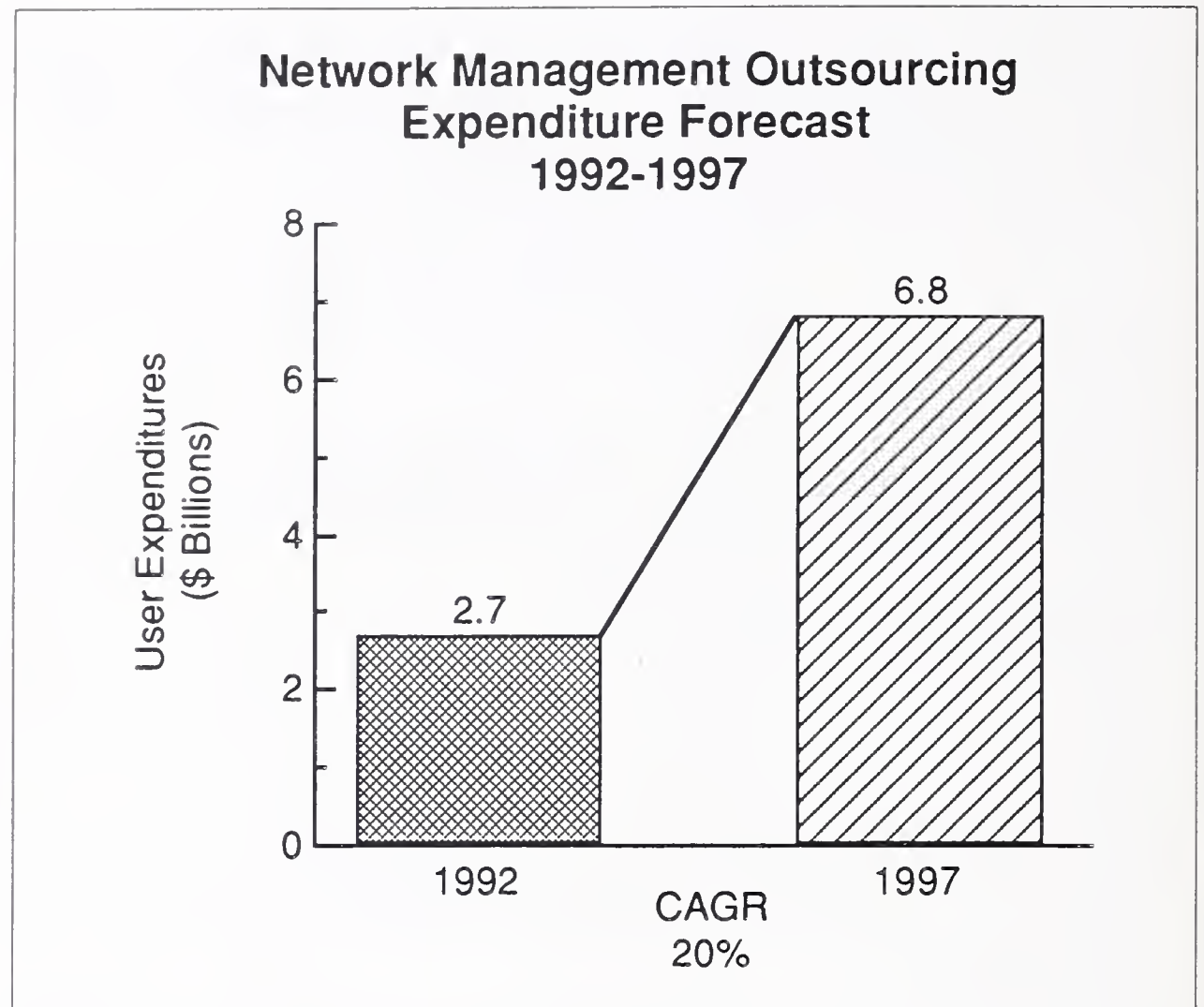
In this report, network management outsourcing refers specifically to contracting with a single organization for the management of all of an organization's network services, including voice, data, and video.

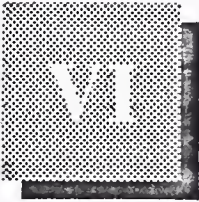
To develop a market forecast, INPUT took a number of factors into account. These included the total expenditures for voice and telecommunications services, the amount of these expenditures that were for commercial purposes, and the number of firms that potentially contract out for these services.

These global figures had to be reconciled with INPUT's projections of the platform operations market and the emerging desktop services outsourcing market. The net projections were also adjusted slightly for the current inflation rates and tempered with vendor views of where the market is going. As a result, INPUT's projections are much different from earlier, less informed projections because they include much more analytical information about the outsourcing market in general.

INPUT estimates that the market for outsourced network management services is approximately \$2.7 billion in 1992, as shown in Exhibit V-6. The market is projected to grow at an estimated compound annual growth rate of 20% in the 1992-1997 period to yield an expenditure level of \$6.8 billion in 1997.

EXHIBIT V-6





Conclusions and Recommendations

This chapter draws conclusions and makes specific recommendations to vendors and users that participate in the network operations management market. A brief discussion of the highlights follows each exhibit.

A

Conclusions

The following conclusions are benefits that have been identified by INPUT and participating users. Users concluded there were significant benefits to outsourcing their networks, as shown in Exhibit VI-1.

EXHIBIT VI-1

User Conclusions

- Significant cost savings
- Network reliability and availability increases
- Satisfied users
- Users can focus on core business

Expected annual saving in telecommunications expenses ranged from 5% to 25% and averaged 16%. Actual savings reported by users averaged 21%.

Network outsourcing increases control over network reliability and availability. Reliable network services available 7 days a week, 24 hours a day are being realized by customers. Increases in reliability result from professional network management, use of advanced networking protocols and standards that enable interoperation between multiple vendors' equipment.

All user outsourcing participants were either satisfied or highly satisfied with their network operations management vendor. These users reported that most of the benefits they anticipated either have been met or are in the process of being realized.

As telecommunications systems become more complex, users are finding themselves committing more resources to network management, thereby diverting scarce resources from their primary business.

INPUT believes that users are experiencing increased competition on a worldwide scale. The increased competitive environment is causing firms to focus on being the best at what they do. A major trend for companies to contract out aspects of their business that can be done more cost effectively by a specialized outside vendor is in process. This contracting has the benefit of providing more time to focus on the user's primary business while saving money. It's a double-win decision!

The following conclusions for vendors have been identified by INPUT and are highlighted in Exhibit VI-2.

EXHIBIT VI-2

Vendor Conclusions.

- Systems integrators have best market position
- Network outsourcing demand increasing
- LANs and voice networks most in demand
- Majority of network outsourcing users also outsource platform operations

- Systems integrators are perceived by users to be the best positioned to meet users' network operations management requirements. Users scored systems integrators 68%. The nearest score was 63% for an alliance between a systems integrator and a common carrier. Hardware vendors, with a score of 53%, were the highest scoring vendor category that didn't include systems integrators.
- Trends in data center downsizing, client/server LANs and interconnection of local-area and wide-area networks will continue to increase the users' emphasis on the network and outsourcing alternatives.
- Users ranked LANs and voice networks as their highest network requirements, but only 71% of vendor respondents include LANs and 50% include voice networks as part of their network operations management arrangement.
- Fifty-seven percent of outsourcing user participants also have contracts to outsource their data center operation. Seventy-five percent of these firms used the same vendor for both arrangements.

B

Recommendations

User recommendations are based on the user and vendor perceptions of network operations management and are summarized in Exhibit VI-3.

EXHIBIT VI-3

User Recommendations

- Partnership—compatible culture and mutual success goals
- Position for the future
- Separate the "who and how" from the "what and when" decisions

The network outsourcing arrangement is a long-term partnership between a company and its vendor. As in any partnership, users should seek vendors with a compatible corporate culture. The vendor's motivations and goals and the user's network goals should be shared and understood up front.

Users should partner with a networking technology leader to increase competitiveness and position the organization for increased future growth.

The initial reaction to outsourcing a firm's telecommunications network may be more an emotional than a business decision. It is possible to outsource the "who and how" and keep control over the "what and when." This division keeps internal control over the strategic direction of the telecommunications network while outsourcing the implementation to an outside vendor.

Companies will direct internal investments into their core business and outsource peripheral or administrative functions such as network operations management.

Vendor recommendations are based on INPUT's analysis of user needs and opportunities for vendor growth. Recommendations incorporate suggestions made by participating vendors and are shown in Exhibit VI-4 and discussed below.

EXHIBIT VI-4

Vendor Recommendations

- Alliances—focus on importance to customer, well-managed
- Consider entry-level network operations arrangement
- One-stop service for network and platform operations management
- Vendor motivation should be consistent with customer's goals

User respondents perceive that systems integrators are best suited to meet their network operations management requirements. An alliance with a systems integrator should be a primary strategic consideration for network outsourcing vendors. Vendors focused exclusively on network operations management arrangements should consider teaming with a platform operations vendor.

Vendors need to excel in managing complex relationships, such as a strategic alliance, for the benefit of the customer and each of the partners. All participants need to have shared goals that are understood up front.

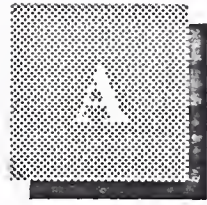
Vendors should consider offering an entry-level network operations arrangement to users that are indecisive. The entry-level arrangement may involve progressive commitments as milestones are met. It should focus on giving the user the opportunity to "see how good it is."

The users' propensity for outsourcing both network and platform arrangements to the same vendor represents an opportunity for vendors to increase revenue and profits.

INPUT believes that users' desire to outsource both their network and data center will drive future vendor teaming arrangements, alliances and acquisitions as vendors expand their market focus.

Both data center and network outsourcing arrangements will leverage one another in meeting user needs. Additionally, network management and systems management are closely coupled and enable the vendor to optimize cost savings across a variety of service needs.

The customers' network requirements for success should map into the vendors' motivations and goals. Vendor network management arrangements should be structured to show users that the vendor's motivation is clearly based on meeting the user's priorities.



Definitions

A

Definitions

INPUT defines a network as electronic interconnections between sites or locations that may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes.

When considering the definition, there are several things to keep in mind.

- The definition encompasses data, voice, video and textual information.
- The definition excludes applications software.

With the definition in mind, vendors of network management services must be aware that a network is viewed differently by end users, by information systems and network managers, and by vendors of network-related equipment or services.

Awareness of these differences is necessary, since the view of a network has a direct bearing on the degree of difficulty in marketing network management services.

1. User Perspective of Networks

Both general industry and INPUT research concludes that end users (salespeople, accountants, executives, etc.) generally view a network as the method by which a fax or a message is sent or received or a telephone call is made.

Beyond the somewhat vague reference to the presence of a network, users have little knowledge of how systems connect or how data is transmitted.

In general, a network is viewed by end users much like a cloud might be viewed. They know that it is there, but have little knowledge of its composition or the complexities of creating one.

Just as people expect days to be sunny, they expect lights to turn on with the change of a switch and networks to transmit data fast and reliably. Users certainly have little, if any, interest in or knowledge of what is required to manage a network.

The user's perspective of a network is important to information systems managers and vendors.

- To the information systems manager, the user's perspective means that increased education and greater effort is needed to instill an understanding of the value of effective network management.
- To the vendor, the user perspective is also important. Since the end user is increasingly the customer, the user must readily understand the value of effective management.

2. Information Systems Management's Perspective of Networks

Information systems management's perspective of a network is important since management must be able to understand the need for a variety of skills to address rapid changes in technology.

From an information systems or telecommunications manager's viewpoint, a network is a collection of discrete parts that must fit together into a single delivery highway. They frequently have little understanding of a user department's needs or concerns.

Since the network management process can be time-consuming and costly, particularly in the light of rapidly changing technology, managers must continually weigh the benefits of in-house management with the advantages of a comprehensive management service.

Compounding the difficulty of managing increasingly complex networks and recognizing that users are increasingly in charge of expenditures, information systems and telecommunications managers must be able to convey management needs and outsourcing options in terms that users can understand.

3. Vendor Perspective of Networks

A vendor's perspective is generally oriented to a specific product or service. Vendors of large PBXs or intelligent multiplexers provide a high degree of product expertise.

However, in the opinion of users, though many products are good and will meet specific needs, vendors do not have sufficiently broad technical or management skills to meet the needs of managing a complex network.

4. Describing Network Management

Network management is the process of managing networks that involve a complex set of interrelated tasks such as network design, configuration management, problem management, capacity/traffic management, and network administration. These tasks accomplish their purpose by balancing a wide variety of technological solutions in a continually changing environment. The primary network management functions are discussed further in this section and have the following characteristics:

- Network design is a continual process of trying to balance the benefits of new technology with the requirements of constantly changing organizations.
- Configuration management is a process of trying to ensure the maximum utilization of available equipment and services.
- Problem management is a process of continually reacting to failures and capacity overloads.
- Capacity management requires that the network be able to handle user needs despite the fact that needs are generally not well known or forecast.
- Network administration requires billing the user very much as a utility bills. Bills have to be accurate and any errors must be corrected. Administration also includes handling orders for new service or changes to existing services. For the purposes of this report, management reporting is considered part of administration. In some larger organizations, management reporting may be a separate task.

As used in this report, the term network management covers a wide range of activities. Although these activities can be described as being in several neatly separated categories, they are, in fact, a closely interwoven set of daily activities.

The following provides a description of major activities included in each of the functions.

B

Network Design

Numerous activities are included as part of network design. Performed inadequately, they can have a significant effect on an organization's strategic position and operational ability.

1. Strategic Planning

In telecommunications, as in other parts of organizations, strategic planning has until recently been given verbal support, but frequently little else. This has begun to change.

Until recently, only a small percentage of information systems organizations included strategic telecommunications planning as part of their plans. Two years ago, users indicated that only 60% of information systems plans included telecommunications. Today, that number has grown to 90%.

An increasing number of organizations have developed strategic telecommunications plans, but the plans are frequently less than comprehensive. The plans are often narrow in focus and oriented to the application of current technology.

In addition, few telecommunications plans are followed. Operational necessity frequently requires focus on daily activities and crisis management rather than strategic planning.

Today, telecommunications is increasingly accepted as a strategic asset and there is increased emphasis on ensuring that integrated networks are in place to meet future needs.

2. Network Design

Network design is an increasingly critical activity for several reasons.

Users are placing increased emphasis on the application of new technology that can improve cost-effectiveness. The ability to use wideband circuits multifunctionally can provide significant economic advantages.

There is an increasing need to integrate LANs into the corporate network. Developed as standalone islands, LANs are becoming a corporate asset and need to be managed like other assets.

Users are devoting more time to planning for the use of public services that will enhance the value of their networks. Services such as EDI and electronic mail are receiving increased attention.

In addition to the development activities, there are continuing needs to assess least-cost routing alternatives for leased circuits. With increases in competition for interexchange services, additional emphasis is being placed by a number of organizations on assessing alternative services and design.

3. Network Optimization

As networks grow and improved technologies become available, opportunities arise to improve the performance of the network. Most users interviewed are in a continuous process of network optimization planning.

The frequent changes in price and structure of existing services and the introduction of new products and services require frequent examination of the network to optimize costs and service performance.

4. Disaster Planning

Few organizations have a formalized disaster plan. Typically, they have plans for management of component failure situations, but few plans address major failures, particularly the failure of a communications center of a serving central office.

C

Configuration Management

Configuration management includes two separate but related activities.

- Static configuration management is maintenance of a network as it exists at a given time, usually at the time it is set up. This is frequently used as a basis for inventory management, but can become quickly outdated.
- Dynamic configuration management is the actual configuration at any given time. It reflects changes that have been made to accommodate line and equipment outages and plans for pending changes.

Frequently viewed as a less important activity, proper management of an organization's configuration can result in significant savings.

As the process of network integration grows in importance, configuration management must also become more important. As an increasing number of workstation and PC users demand access to corporate systems, network managers must have knowledge of the demands that can be made at any given time.

D

Problem Management

Problem management is the most common function of network management, and continues to require the largest portion of network management expenditures. But it is only one of many tasks.

Although users expect that new diagnostic tools, digital networks, and improved management procedures will help contain costs, the integration of complex networks may make problem management increasingly difficult in the future.

In a network, identification of a problem can be difficult and time-consuming. Integration will make this problem more difficult.

- Isolating a faulty piece of equipment at the distant end of a network will require sophisticated tools that are only now becoming available. The complexity of the task is greater when device types are mixed on a network.
- In an integrated network, differing areas of expertise are needed to assist in problem identification and resolution. The skills necessary to identify, for example, voice system and LAN network problems are frequently different.

E

Capacity Management

As networks grow in size and numbers of applications supported, the process of managing capacity becomes increasingly complex. The process will become more complex in the future, as organizations focus on integrated network services.

Forecasting capacity has always been difficult. Information systems forecast in technical terms (transactions), and users forecast in volume of business (purchase orders). Traditionally, reconciling the two in terms of network capacity requirements has been less than satisfactory.

As network elements become integrated, forecasting will become increasingly difficult. The capacity forecasting measurements of voice and data have always been different, making integration difficult. The addition of a LAN to an integrated network will make the process of forecasting capacity requirements even more difficult.

F

Network Administration

The process of network administration is similar to that used by large common carriers. Activities include maintaining a directory, handling orders for new equipment and maintaining a catalog of equipment allowed on the network.

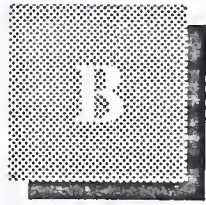
Network administration is highly customer-oriented, labor-intensive, and time-consuming. Although the integrated networks of the future may reduce some of the problems of the past, they will increase the complexity and costs of network administration in some organizations.

G

Definitions of Related Terms Used in Report

- Outsourcing is the contracting of all or a major part of an information systems process to an external vendor on a long-term basis. The vendor takes responsibility for the performance of the process. Outsourcing can include any or all of the following elements:
 - Processing Operations (Platform) - The vendor is responsible for managing and operating the client's computer systems.
 - Network Operations - The vendor assumes full responsibility for the client's data communications systems. This may also include the voice communications of the client.
 - Applications Maintenance - The vendor has full responsibility for maintaining the applications software that the vendor uses as part of its business operations.
 - Applications Management - The vendor has the responsibility to maintain and upgrade existing software as well as develop and implement new software for the client as the need arises.
 - Desktop Services - The vendor assumes responsibility for the deployment, maintenance and connectivity between the PCs in the client organization.
- Local-Area Network (LAN) - A geographically constrained data networking resource, typically limited to one site or group of co-located buildings. Usually of limited bandwidth suitable for use with E-mail and client/server applications, but can also include larger communications pipelines within the limits of site orientation.
- Metropolitan-Area Network (MAN) - A data network expanded beyond single-site LAN limits to include a community-specific or campus-like network environment.
- Wide-Area Network (WAN) - A data network expandable nationally, which can have both dedicated and dial-up components. The bandwidth is usually capable of carrying large quantities of data.

- Intersite Data Networks - A point-to-point network connecting two or more sites, typically configured to meet peak transmission volume requirements. Can provide gateways or interconnects to LANs, MANs or WANs.
- International Data Network - Any data network crossing international boundaries. Typically involving the use of IRCs (international record carriers) and domestic carriers, which interconnect at international gateways.



User Questionnaire

(Part I) User Environment

First, we would like to verify your company's demographics.

1. What was the approximate revenue and employee size of your company in 1991? (Be consistent with telecommunications services provided below.)

Revenue (Approx.) _____
 Employees (Approx.) _____

2. What are the principal requirements of your company's network? Please rank on a scale of 1-4 (1 is lowest).

International	_____	National	_____
Regional	_____	Local	_____

Next, we would like to get an understanding of network management in your firm.

3. In your company, does network management include responsibility for voice, data, video and image communications in a single organization?

_____ Yes. Which organization?

Interviewer: Skip to next question

_____ No. If no, do you expect that one organization will have responsibility for voice, data and video and image communications within the next five years?

_____ Yes. Which organization?

_____ No.

4. In what way(s) do you integrate (or separate) voice, data, video and image communications requirements in your firm?

5. Are your data networks managed by in-house staff or by an outside contractor?

_____ In-house
 _____ Outside Contractor

(Interviewer: Go to Part III)

(Part II) In-house Management

6. Please tell me which of the following most closely reflects your 1991 annual expenditures for corporate telecommunications.

Interviewer: Check for consistency with #1 above.

_____ \$500,000 or less
 _____ \$500,000 to \$1 Million
 _____ \$1-5 Million
 _____ \$5-10 Million
 _____ \$10-20 Million
 _____ \$20-50 Million
 _____ Over \$50 Million

7. Of your total 1991 telecommunications expenditures, please estimate the percentage for each of the following:

(Interviewer Note: Total should equal 100%. Try to get percentage estimate even if expenditure information was not provided).

_____ % Circuit, toll, or access charges
 _____ % Hardware (modems, multiplexers, PBX, etc.)
 _____ % Network hardware maintenance
 _____ % Internal staff
 _____ % External staff (consulting)
 _____ % Other (specify)

8. Of the total 1991 telecommunications expenditures for external consulting, what percent is spent for each of the following functions?

_____ Network design
 _____ Configuration management
 _____ Problem management
 _____ Capacity/traffic management
 _____ Network administration
 _____ Other (specify) _____

9. Of your total 1991 telecommunications expenditures, please estimate the percentage that is spent for each of the following functions. The total should equal 100%.

_____ % Network design
 _____ % Configuration management
 _____ % Problem management
 _____ % Capacity/traffic management
 _____ % Network administration (e.g., billing, inventory control)
 _____ % Other (specify) _____

10. Of your total 1991 telecommunications expenditures, what percent is spent for each of the following communication requirements? Please estimate the respective percentages of each market segment for 1997. The total should equal 100%.

Market Segment	1991 % of Total	1997 % of Total
Voice Communications	_____	_____
Data Communications	_____	_____
Video Communications	_____	_____
Image Communications	_____	_____
Other (Specify) _____	_____	_____
Total	___100___	___100___

11. Please rank the following network services in their importance to your company's needs on a scale of 1-5 (1 is lowest).

_____ Voice
 _____ LAN/MAN
 _____ WAN
 _____ Intersite data networks (i.e., long lines)
 _____ International data networks

Now we would like to ask your opinion of industry trends that could cause changes in network management over the next several years.

12. Have you considered having an outside contractor assume full responsibility for managing all or part of your networks?

_____ Yes

_____ No (Skip to question 14.)

13. Can you tell me the major reasons why you decided not to have a contractor assume responsibility for managing your networks?

Interviewer: Skip to question 15.

14. Can you tell me why you have not considered having a contractor assume responsibility for managing your networks?

15. What types of changes (internal or external) might cause you to consider contracting with a vendor to manage your networks in the future?

Interviewer: Go to Part IV

(Part III) Outside Vendor

16. Who is your network management vendor?

17. Please indicate which of the following types of networks are included in the vendor's contract.

_____ Voice

_____ Local-area networks and metropolitan-area networks

_____ Wide-area networks

_____ Intersite data networks (i.e., long lines)

_____ International data networks

18. What is the term of your contract?

_____ years

How long have you had your networks managed by an outside contractor?

_____ Less than 1 year

_____ 1-2 years

_____ 2-3 years

_____ 3-5 years

_____ Over 5 years

19. Which of the following functions are included as part of the vendor's contract?

_____ Hardware maintenance

_____ Network design

_____ Configuration management

_____ Problem management

_____ Capacity/traffic management

_____ Network administration (e.g., user billing, inventory control)

_____ Other (Specify)

20. Please tell me which of the following most closely reflects your annual expenditures for corporate telecommunications before contracting with the outside vendor? Interviewer: Check for consistency with #1 above.

_____ \$500,000 or less

_____ \$500,000 to \$1 Million

_____ \$1-5 Million

_____ \$5-10 Million

_____ \$10-20 Million

_____ \$20-50 Million

_____ Over \$50 Million

21. Of the total corporate telecommunications expenditures, what percentage was managed by an outside contractor in 1991? _____%

22. Of your network expenditures (above) managed by an outside contractor:

What percent was from voice, data, video and image communication services?

Please estimate the respective percentages of each market segment for 1997?

Market Segment	1991% of Total	1997 % of Total
Voice Communications	_____	_____
Data Communications	_____	_____
Video Communications	_____	_____
Image Communications	_____	_____
Other (Specify)_____	_____	_____
Total	__100__	__100__

23. Could you estimate the annual percentage saving for corporate telecommunications that you expect by contracting with an outside vendor? _____ %
24. Can you tell me how much savings you actually realized in 1991?

25. In your view, what qualifications should a vendor have to provide network operations management services?

26. Could you identify the key reasons you contracted with a vendor for network management (top three reasons)?

27. Which of the benefits you expected from contracting with a vendor for network management have been realized? Which are yet to be realized?

Benefits Realized

Benefits Yet to be Realized

28. Overall, are you _____ highly satisfied, _____ satisfied, or _____ unsatisfied with your network management vendor?
29. Do you have a contract with a vendor to manage your information processing operations in addition to your network?
- _____ Yes
_____ No (Skip to Part IV)
30. Is the vendor for network management and information processing the same vendor? If not, why not?
- _____ Yes
_____ No

(Part IV) Questions Common to Both In-house and Outside Management

31. Do you consider the decision to contract with a network management vendor to be primarily financial, strategic or other?
- _____ Financial decision
_____ Strategic decision (How?)
_____ Other (Specify) _____

Please explain:

32. Do you think that contracting with a vendor for management of a company's network is a growing trend? _____ Yes _____ No
Why?

33. What are the major trends or issues that can influence growth of the network operations management services market over the next five years? Please indicate positive and negative trends or issues.

Positive:

Negative:

34. In your judgment, who are the leading vendors of network management services (top three)? What are their respective strengths and strategies?

	Strengths	Leading Vendors	Strategies
1.			
2.			
3.			

35. What technology changes will impact network management outsourcing growth over the next five years?

36. How are network management alliances (teaming relationships between vendors) working from your perspective? Do you see these relationships as long-term, strategically viable? Or short-term and more tactical ?

37. If you were to contract with an outside vendor to manage your network(s) today, how well do you think each of the following types of vendors could meet your needs? Please rank each on a scale of 1% to 100% of your needs.

_____ Hardware vendor (DEC, IBM, Unisys, etc.)
_____ Common carrier (AT&T, MCI, Sprint)
_____ Systems integrator (EDS, Andersen Consulting, CSC, etc.)
_____ Alliance between a systems integrator and a common carrier
_____ Alliance between a systems integrator and a hardware vendor
_____ Value-added carrier (BT/Tymnet, MCI/Infonet, GEISCO, Telenet, etc.)
_____ Network hardware vendor (Codex, NET, Tymplex, etc.)
_____ Independent vendor (communications consultant, etc.)
_____ International network consortia (Syncordia, MCI Global Advantage, AT&T's Joint Network Initiative)

38. In your company, who would make the decision to use (or change) an outside contractor to manage your network?

(Job Title)? _____

One last question:

39. Can you identify the characteristics that you believe best indicate a company's need for outside network management services (top three)?

Thank you

If we can get your correct address, we will be pleased to send you a copy of the executive summary when the report is complete.

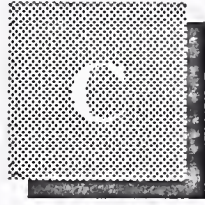
Name: _____

Title: _____

Phone: _____

Company: _____

Address: _____



Vendor Questionnaire

First, we would like to understand the importance of network operations management to your business.

As a point of reference, INPUT defines network operations management as the management of all or part of a user's voice and data network functions under a long-term contract. As part of the contract, you must plan, control, operate and manage the user's data network(s) at the client's site or your site.

1. Is network operations management a strategic service currently offered by your firm?

_____ Yes
_____ No (Interviewer: Skip to end)
2. How long has your company been offering network operations management services?

_____ years
3. Of your total company revenue, what percent is represented by network management services in 1991? _____%. Interviewer: For companies in multiple industries, use division's revenue in place of company revenue.
4. What percent of your network management services revenue is from the public versus private sector in 1991? _____% Public sector, _____% Private sector.
5. Of your 1991 network management services revenue, what percent was from U.S.-based firms and from firms based outside the U.S.?

_____ % from U.S.-based firms
_____ % from firms based outside the U.S.

6. Which of the following types of networks do you include as part of your services?

☐ Voice networks
☐ Local-area/metropolitan-area networks
☐ Wide-area networks
☐ Intersite data networks (i.e., long lines)
☐ International data networks
☐ Other (Specify) _____

7. Which of the following functions are included as part of your services?

☐ Hardware maintenance
☐ Network design
☐ Configuration management
☐ Problem management
☐ Capacity/traffic management
☐ Network administration (e.g., billing, inventory control)
☐ Other (Specify) _____

8. Please tell me which of the following most closely reflects your annual revenue from network management services. How many network management contracts does this represent?

_____ contracts.

☐ \$500,000 or less
☐ \$500,000 to \$1 Million
☐ \$1-5 Million
☐ \$5-10 Million
☐ \$10-20 Million
☐ \$20-50 Million
☐ Over \$50 Million

9. What is the annual amount and term of your average contract for network management services in the private sector?

_____ \$ Millions per year. Contract term? _____ years.

10. Of your total revenues from network management services, please estimate the percentage that is derived from each of the following: (Interviewer Note: Total should equal 100%. Please try to get a percent breakdown even if revenue data is not provided.)

☐ % Circuit, toll, or access charges
☐ % Hardware maintenance
☐ % Network management
☐ % Other (Specify) _____

(Interviewer Note: Network management includes: network design, configuration management, problem management, capacity management, and administration.)

11. What percent of your network operations management revenue in 1991 was from voice, data, video and image communication services? Please estimate the respective percentages of each market segment for 1997.

Market Segment	1991 % of Total	1997 % of Total
Voice Communications	_____	_____
Data Communications	_____	_____
Video Communications	_____	_____
Image Communications	_____	_____
Other (Specify)_____	_____	_____
Total	__100__	__100__

12. Do you have any contracts to perform systems operations management? (Systems operations management is the management of all or part of a user's systems functions under a long-term contract. As part of the contract, you plan, control, operate and manage the systems either at the client's site or at your site).

_____ Yes
_____ No (If no, Interviewer skip to question 14)

13. What percentage of your network management contracts do you also have the contract for systems operation management? _____%.
What percentage of your systems operation management contracts do you also have the contract for network management? _____%.

Now we would like to ask your opinion of industry trends that could cause changes in network management over the next several years.

14. In your judgment, how will network operations management contract services change over the next five years?

15. Do you think that contracting with a vendor for management of a company's network is a growing trend? _____ Yes _____ No
Why?

16. In your estimation, what will be the annual growth rate for contracted network management expenditures over the next five years?
_____ %.

17. What are the major trends or issues that can influence growth of the network operations management services market over the next five years? Please indicate positive and negative trends or issues.

Positive:

Negative:

18. In your view, what qualifications should a vendor have to provide network operations management services?

19. Please describe the differences in managing the customer requirements for each of the following:

1 - Voice _____

2 - Data _____

3 - Video _____

4 - Image _____

5 - Transmission _____

6 - LAN/WAN _____

20. In your judgment, aside from your firm, who are the leading vendor of network operations management services (top three)? What are their respective strengths and strategies?

	Leading Vendors
	Strengths Strategies
1.	_____
2.	_____
3.	_____

21. How would you characterize your firm's principal strategy and uniqueness for providing network operations management services?

22. Do you consider that a user's decision to contract with a vendor for network operations management is primarily a financial decision, a strategic decision or other?

_____ Financial decision

_____ Strategic decision (How?)

_____ Other

(Specify) _____

Please explain:

23. Can you identify the characteristics that you believe best indicate a company's need for outside network management services (top three)?

24. What technology changes will impact network management outsourcing growth over the next five years?

25. Has your company entered into a strategic alliance for network operations management services? _____ Yes, what firm?
_____. _____ No

26. How are network management alliances (teaming relationships between vendors) working from your perspective? Do you see these relationships as long-term, strategically viable? Or short-term and more tactical ?

27. In your customer base, who makes the decision to use an outside contractor to manage their network? (Job Title)?

_____.

How many months does it typically take to make this decision?
_____ months.

28. Can you estimate the annual percentage saving for corporate telecommunications your customers actually realized in 1991? _____%
29. Which of the benefits have been realized from contracting for network management? Which are yet to be realized?

Benefits Realized

Benefits Yet to be Realized

30. Do you measure customer satisfaction for your network operations management?

- _____ Yes. If so, what is the overall level of customer satisfaction?
_____ (High, Medium, Low)
_____ No

Thank you

Now, if I can confirm your address, we will be pleased to send you a copy of the executive summary when the report is complete.

Name: _____

Title: _____

Phone: _____

Fax: _____

Company: _____

Address: _____

